PB-214 977

STATEWIDE INVENTORY OF AIR POLLUTANT EMISSIONS; STATE OF OHIO 1970 (REVISED)

PEDCo Environmental

Prepared for:

Environmental Protection Agency

14 January 1972

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PB 214 977

STATEWIDE INVENTORY
OF
AIR POLLUTANT EMISSIONS
STATE OF OHIO
1970
(Revised)

Prepared for:
The Environmental Protection Agency
Durham, North Carolina 27701

Authorization:
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The results of an emissions inventory for the State of Ohio are presented. The purposes of the study were: (1) to determine the quantities of five air pollutants emitted in Ohio; (2) to calculate point and area source emission quantities; (3) locate sources on maps of gridded areas; (4) summarize and tabulate the results for use in developing an implementation plan for Ohio. The survey which included the entire State of Ohio concerned the following pollutants: particulates; sulfur oxides; nitrogen oxides; carbon monoxide; and hydrocarbons. Air pollution emissions were divided into eight source categories. The Universal Transverse Mercator System (UTM) was used as the reference system for grid delineation.

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1.0 TASK DESCRIPTION

This report presents the results of an emissions inventory for the State of Ohio. The purposes of the study were:

1. To determine the quantities of five air pollutants emitted in Ohio.
2. To calculate point and area source emission quantities.
3. Locate sources on maps of gridded areas.
4. Summarize and tabulate the results for use in developing an implementation plan for Ohio.

The survey included the entire State of Ohio. The five pollutants included in the emission inventory were:

- Particulates
- Sulfur Oxides
- Nitrogen Oxides
- Carbon Monoxide
- Hydrocarbons

Point source emission calculations for the Cleveland, Toledo, Dayton, and Cincinnati Regions were made by PEDCo-Environmental. The remaining point source calculations as well as all follow-up contacts were made by the State of Ohio Air Pollution Control Unit. PEDCo-Environmental made the area source calculations and assembled the area and point source emission data into the required format.

Air pollution emissions were divided into eight source categories shown below. The Universal Transverse Mercator System (UTM) was used as the reference system for grid delineation.

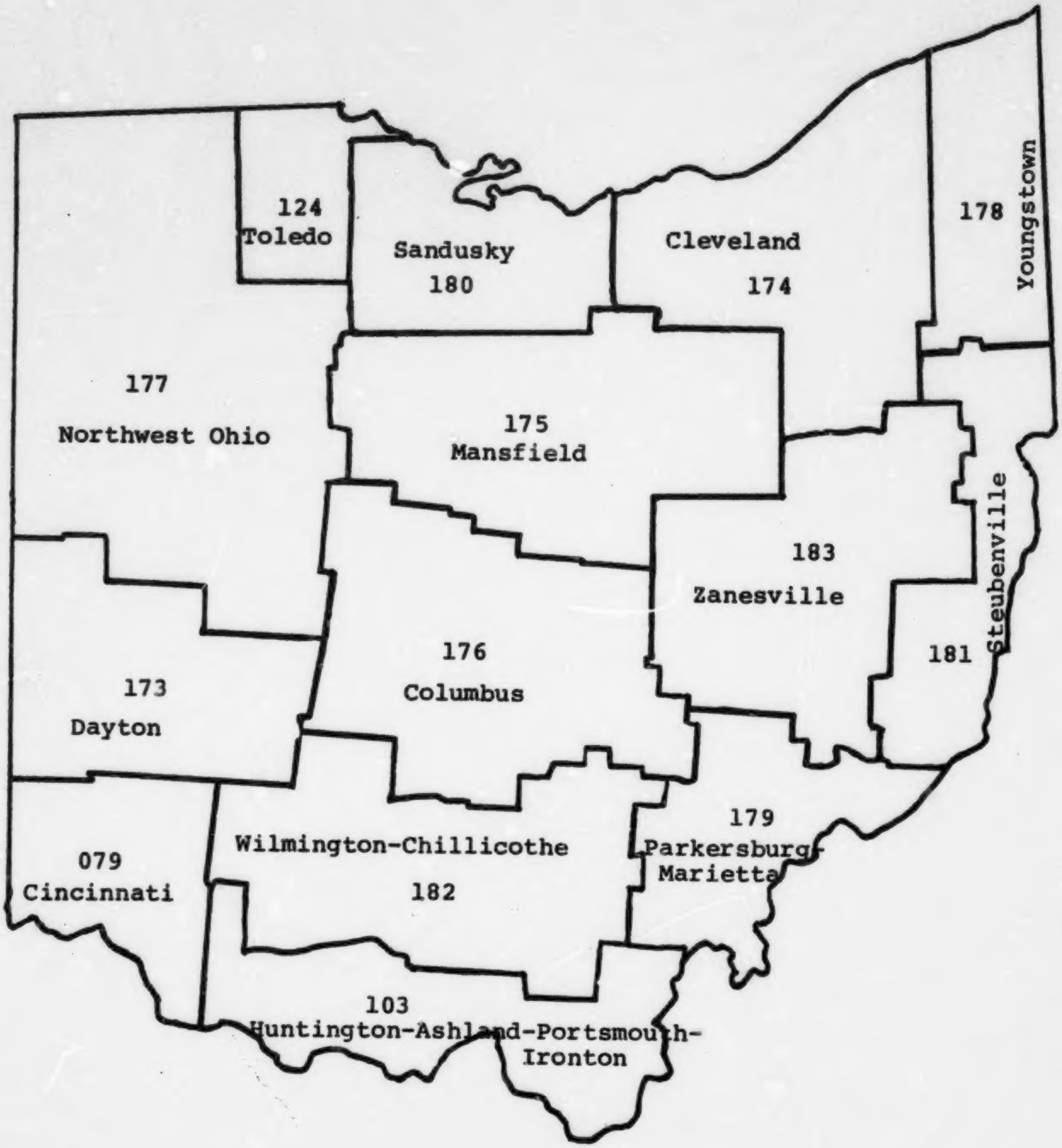
The eight source categories were:

1. Residential Fuel - Area Source
2. Commercial, Institutional and Industrial - Point Source (Excludes Steam-Electric Power Plant)
3. Fuel Combustion - Steam-Electric Power Plants
4. Process Losses - Point Sources
5. Solid Waste Disposal - Point and Area Sources
6. Transportation - Gasoline Motor Vehicles
7. Transportation - All Other Vehicles
8. Miscellaneous.

2.0 AREA DESCRIPTION

The Environmental Protection Agency has designated fourteen Air Quality Control Regions in the State of Ohio, six of which are Interstate (Figures 2.1 and 2.2). A tabulation of the counties contained in each region is presented in Table 2.1. The Cincinnati, Cleveland, Dayton, Steubenville, and Toledo Regions have been subdivided into grids for area source emissions.

A map showing the grids for only the Cleveland Region is presented (Figure 2.3) since this Region will be considered an example region for particulates and sulfur dioxide. Also presented for the Cleveland Region is a map showing all point sources emitting 1000 tons per year or more of any pollutant (Figure 2.4). A set of maps showing all point sources which emit more than 25 tons per year of any pollutant is available at the offices of the State of Ohio Air Pollution Control Unit.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Youngstown
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Northwest Ohio
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Mansfield
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Zanesville
Steubenville
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Columbus
173
Dayton
179
Parkersburg-
Marietta
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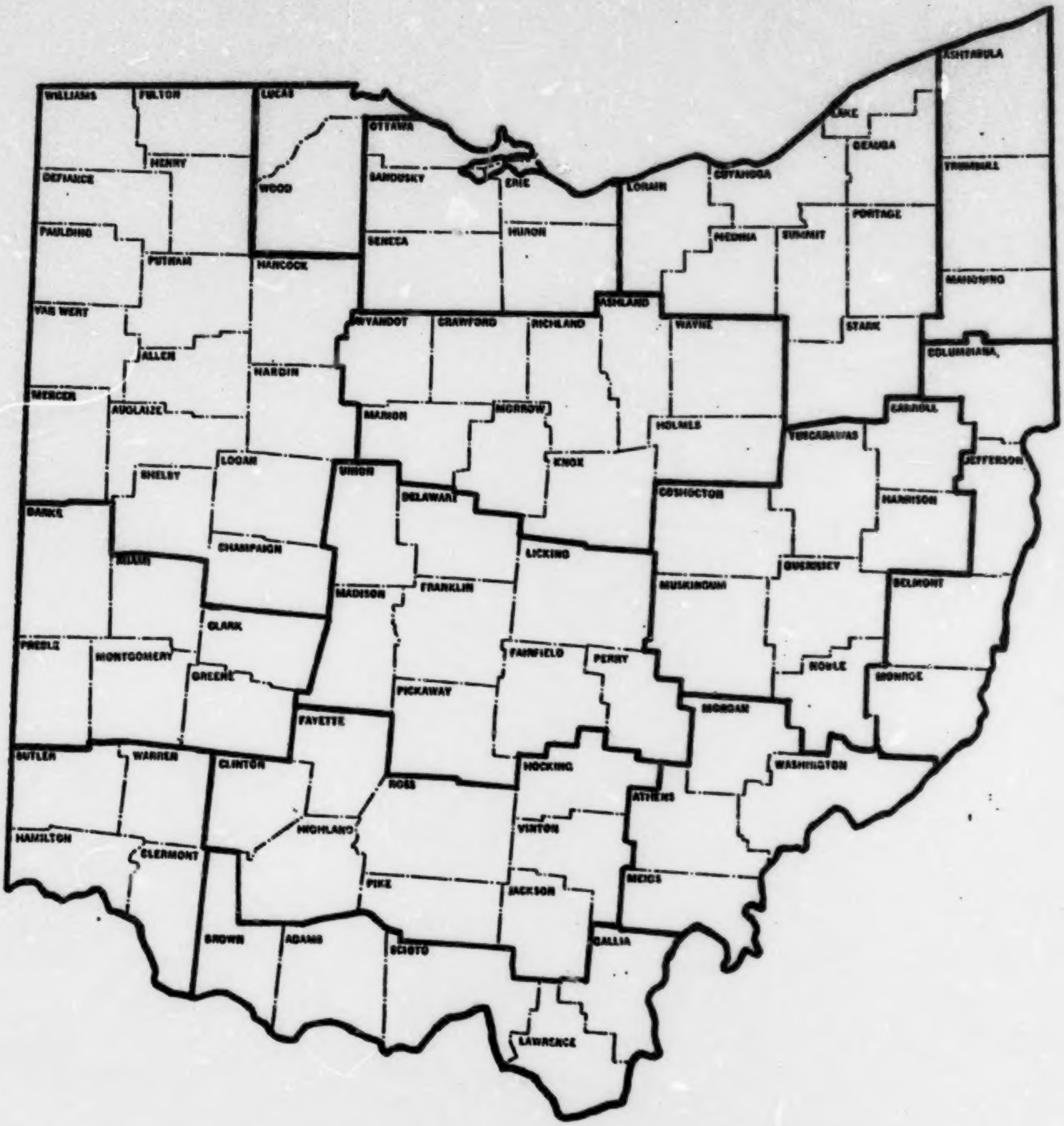
Cincinnati
Wilmington-Chillicothe
182
103
Huntington-Ashland-Portsmouth-
Ironton

Figure 2.1 State of Ohio Air Quality Control Region.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DELAWARE
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DARKE
CHAMPAIGN
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BELMONT
MADISON
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MUSKINGUM
CLARK
FAIRFIELD
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PREBLE
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CLERMONT
MEIGS
PIKE
JACKSON
GALLIA
BROWN
ADAMS
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Figure 2.2 Counties within Air Quality Control Regions

Table 2.1

OHIO REGIONS AND PROSPECTIVE COUNTIES

REGION		COUNTIES			
Code	Name	Code	Name	Code	Name
079	Cincinnati	11	Butler	13	Hamilton
		12	Clermont	14	Warren
103	Portsmouth-Ironton	16	Adams	19	Lawrence
		17	Brown	20	Scioto
		18	Gallia		
124	Toledo	02	Lucas	03	Wood
173	Dayton	01	Clark	04	Miami
		02	Darke	05	Montgomery
		03	Greene	06	Preble
174	Cleveland	01	Lorain	05	Portage
		02	Cuyahoga	06	Summit
		03	Lake	07	Medina
		04	Geauga	08	Stark
175	Mansfield-Marion	01	Ashland	06	Morrow
		02	Crawford	07	Richland
		03	Holmes	08	Wayne
		04	Knox	09	Wyandotte
		05	Marion		
176	Columbus	01	Delaware	05	Madison
		02	Fairfield	06	Perry
		03	Franklin	07	Pickaway
		04	Licking	08	Union
177	Northwest	01	Allen	09	Logan
		02	Auglaize	10	Mercer
		03	Champaign	11	Paulding
		04	Defiance	12	Putnam

Table 2.1

OHIO REGIONS AND PROSPECTIVE COUNTIES

REGION		COUNTIES			
Code	Name	Code	Name	Code	Name
177	Northwest	05	Fulton	13	Shelby
		06	Hancock	14	Van Wert
		07	Hardin	15	Williams
		08	Henry		
178	Youngstown	01	Ashtabula	03	Trumbull
		02	Mahoning		
179	Marietta	01	Athens	03	Morgan
		02	Meigs	04	Washington
180	Sandusky	01	Erie	04	Sandusky
		02	Huron	05	Seneca
		03	Ottowa		
181	Steubenville	01	Belmont	03	Jefferson
		02	Columbia	04	Monroe
182	Wilmington-Chillicothe-Logan	01	Clinton	05	Jackson
		02	Fayette	06	Pike
		03	Highland	07	Ross
		04	Hocking	08	Vinton
183	Zanesville	01	Carroll	05	Muskingum
		02	Coshocton	06	Noble
		03	Guernsey	07	Tuscarawas
		04	Harrison		

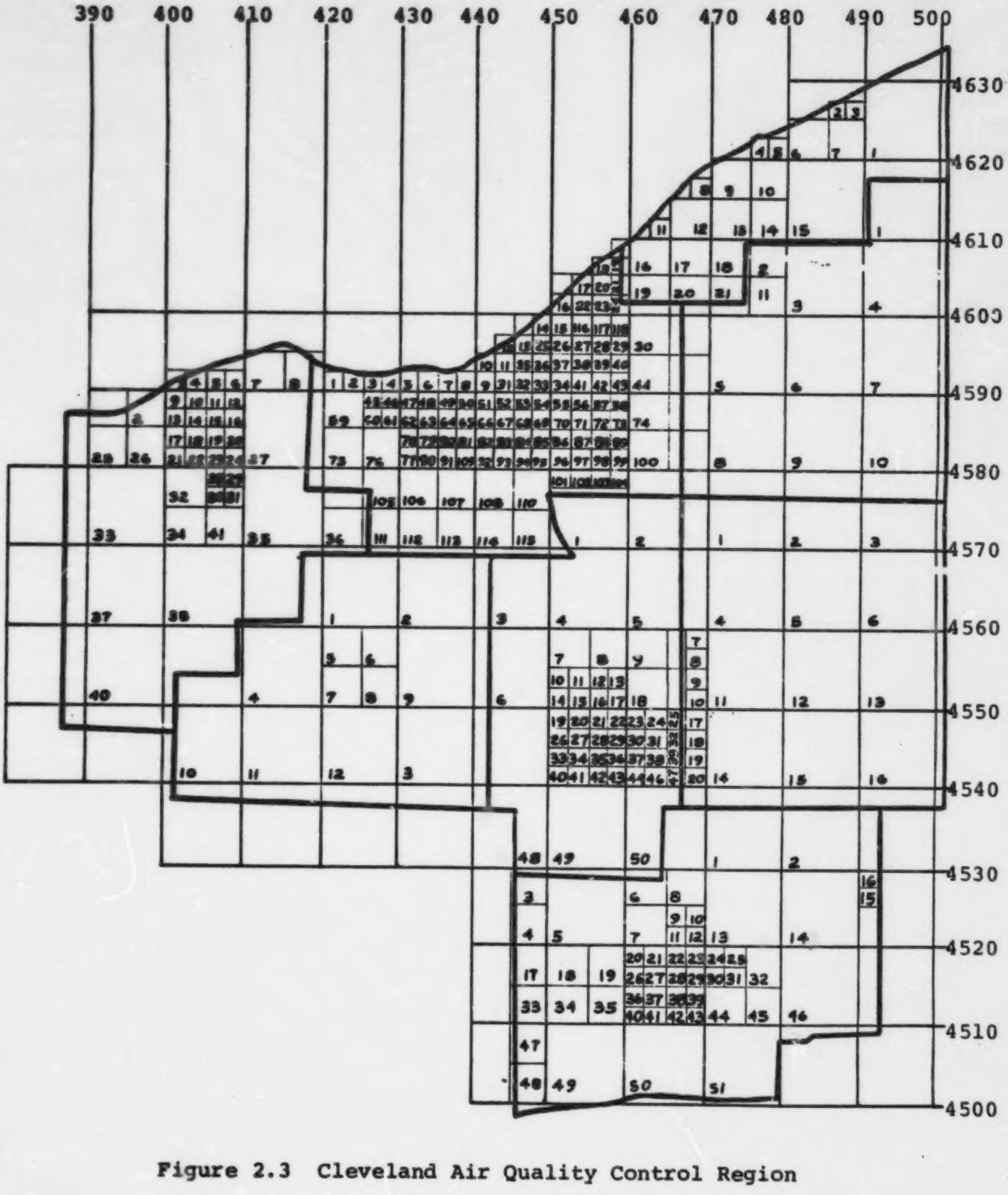
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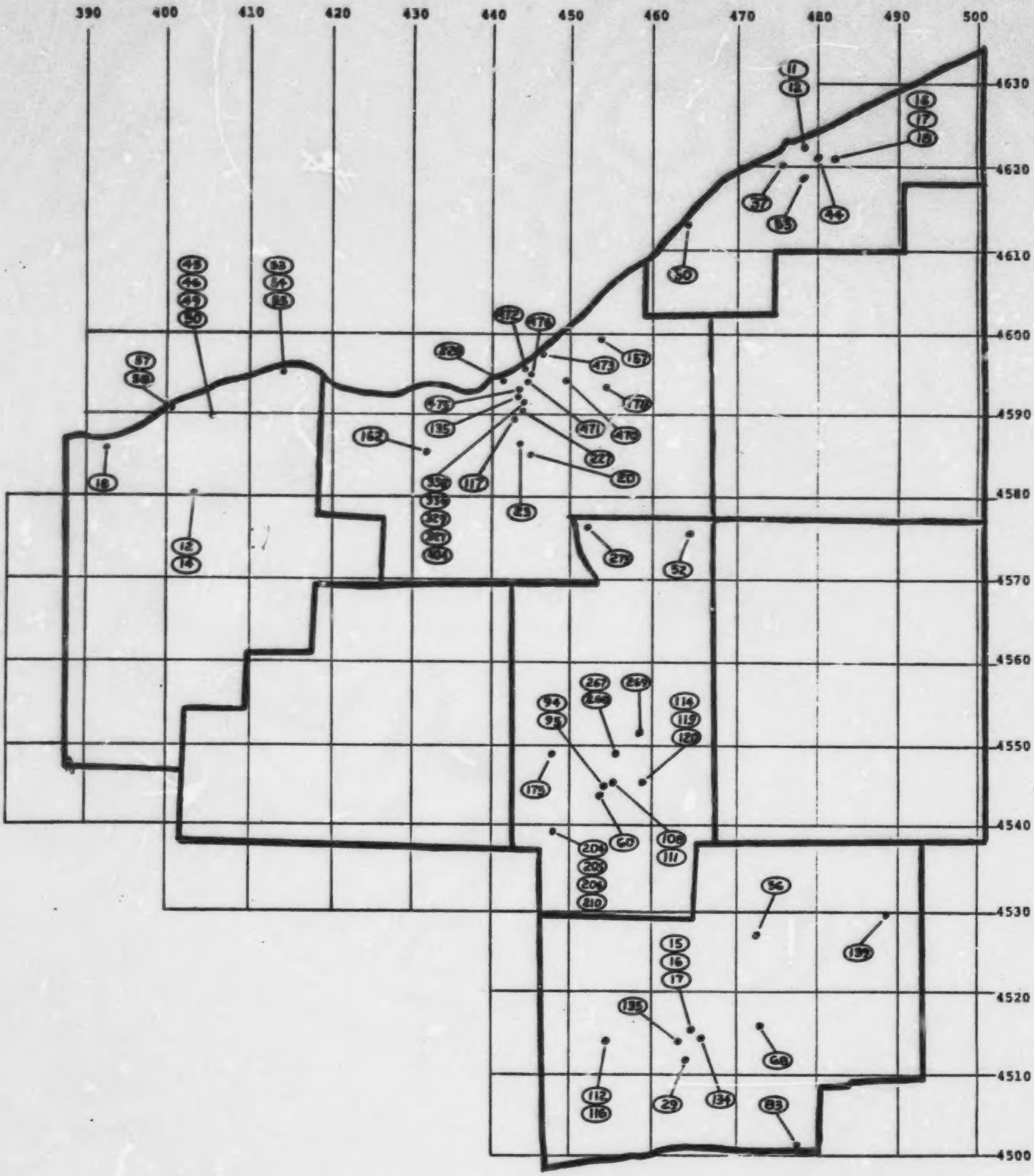
Figure 2.3 Cleveland Air Quality Control Region

Area Source Grid System.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112
116
29
134
83

Figure 2.4 Location of Major Point Sources in Cleveland Air Quality Control Region.
(1000 tons/year or more-any pollutant)

3.0 METHODOLOGY

3.1 Point Sources

For purposes of this study, a point source was defined as any source which emits twenty-five tons or more of any single pollutant. In addition, most, if not all, of the processes defined in Appendix C of the Federal Register, April 9, 1971, were included as point sources irrespective of the quantity of pollutants emitted.

Approximately 3,600 questionnaires were sent to suspected point sources. Reasonably complete information was obtained from 2,544 sources. Diligent efforts by area representatives of the State Agency insured that all point sources were considered. Particular emphasis was placed on follow-up contacts to obtain the maximum information from each respondent source.

Emissions were calculated by applying emission factors to fuel quantities, refuse quantities and production rates which were obtained by questionnaires. The extent of control on each point source was also determined by questionnaire. Emissions from each point source are listed in the computer print out. The computer print out also lists a summary of the county point source totals.

A summary tabulation of both point and area source emissions for each region is contained in Section 5.0 of this report.

Figure 3.1 is an example of the "load sheet" completed for each point source. Four punch cards, identified by the letter designation A, B, C or D in column 80, are required for each source.

Allowable emissions for sources in the Cleveland region were calculated for existing regulations and were keypunched onto the "C" cards.

Allowable emissions for the Cleveland, Zanesville, and Cincinnati regions were computer calculated for regulations published in the Federal Register dated April 7, 1971, and were machine punched onto the "D" cards.

In some cases insufficient data were present, which precluded allowable emission calculations. This condition is easily recognized in computer listing by presence of a "1" in either Max. Boiler Capacity or Normal Process Weight. This quantity is also used in the case of a liquid process such as a refinery process.

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Figure 3.1 POINT SOURCE DATA FORM

SOURCE NUMBER	REGION	SIC	SITE	PROCESS CODE	DESCRIPTIVE NAME (a)	COORDINATES KM		POLITICAL JURISDICTION	OWNER (b)	TYPE (c)	OPERATING (hours/year)	STACK PARAMETERS				MAXIMUM GAS VOLUME 10^3 (ACFM)	PLUME RISE (ft^2/sec)	
						X	Y					HEIGHT (ft.)	DIA. (ft.)	TEMP. (°F)	VELOCITY (ft/sec)			
																		A

SOURCE NUMBER	MAXIMUM PROCESS WEIGHT RATE (lb/hr)	NORMAL PROCESS WEIGHT RATE (lb/hr)	COMMENTS (a)	MAXIMUM BOILER CAPACITY (10^6 BTU/hr)	(d) E F	COAL (tons/year)	(d) E F	RESIDUAL OIL (10^3 Gal/year)	(d) E F	DISTILLATE OIL (10^3 Gal/year)	(d) E F	NATURAL GAS (10^6 CF/year)	HEAT CONTENT				
													COAL 10^6 (BTU/ton)	RESIDUAL OIL (10^3 BTU/Gal.)	DIST. OIL (10^3 BTU/Gal.)	NATURAL GAS (BTU/CF)	
																	B

SOURCE NUMBER	% ASH COAL	SULFUR CONTENT				CONTROL EFFICIENCY		DEVICE INDENT	COMMENTS (a)	HAND CALCULATED EMISSIONS (tons/year)					ALLOWABLE EMISSIONS (tons/year)		
		COAL	RESID.	DIST.	NAT. GAS	PART	SO_2			PART.	SO_2	CO	HC	NO_2	PART	SO_2	
																	C

SOURCE NUMBER	Allowable emission model regs. (T/Yr.) COMMENTS (a)					
	Part.	SO_2		Street Address	Zip	
						D

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

(a) Letters and numbers may be put in these columns
(b) Owner → Private 1; Local 2; State 3; Federal 4; Utilities 5.
(c) Type → Process = 1; Fuel Combustion = 2; Solid Waste Disposal - 3.
(d) EF → refers to emission factor set number associated with emission factors on emission factor sheet.

All decimal points are implied and are signified by a ▼ between columns.

In some cases company sources were consolidated, but generally the completeness of the questionnaire is reflected by the number of sources from the company in question.

Due to the restrictions of the point source data format, some fuel which is used for strictly process purposes (e.g., oil used for firing a cement kiln) is not included on the computer listing. Table 3.1 lists by AQCR both the quantity of fuel which was not included and the correct AQCR totals for fuel combustion by all point sources.

3.2 Area Sources

Figures 3.2 and 3.3 are the load sheets prepared for the calculation of area source emissions. The source category totals (e.g., AQCR residential natural gas usage) were entered on forms similar to Figure 3.2. Factors to apportion these totals to smaller units such as counties or grids were entered on forms similar to Figure 3.3. A separate form was completed for each unit to which data were apportioned. The computer was programmed to determine the ratio of the number entered in a field (e.g., A-3, domestic natural gas) to the sum of the numbers entered in that same field on the other apportioning sheets. This ratio was applied to the

Figure 3.2

TABLE 1 Source Category Totals Input Sheet

	Region	Political Jurisdiction	State	RESIDENTIAL			Commercial + Institutional				Industrial	
				COAL TONS/year F1	FUEL OIL 10^{3}gal/year F2	NAT. GAS 10^6 FT^3/year F3	COAL TONS/YEAR F4	Residual Oil 10^3 Gal/year F5	Distillate Oil 10^3 Gal/year F6	Nat. Gas 10^6 Ft^3/year F7	COAL TONS/YEAR F8	Residual Oil 10^3 Gal/year F9
1	2 3 4	5 6	7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

	Region	Political Jurisdiction	State	Industrial								
				Distillate Oil 10^3 Gal/year F10	Nat. Gas 10^6 Ft^3/year F11	WOOD TONS/YEAR F12	open Burning TONS/YEAR F13	Incineration TONS/YEAR F14	Solvent Evaporation TONS/YEAR F15	Vessels Diesel 10^3 Gal/year F16	Rail Roads 10^3 Gal/year F17	Diesel Motor Vehicles 10^3 Gal/year F18
1	2 3 4	5 6	7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48	49 50 51 52 53 54 55 56	57 58 59 60 61 62 63 64	65 66 67 68 69 70 71 72	73 74 75 76 77 78 79 80

	Region	Political Jurisdiction	State		Gasoline Motor Vehicles			
				OTHER /year F19	25MPH 1000 Vehicle mile/year F20	45MPH 1000 vehicle mile/year F21	OTHER /year F22	
1	2 3 4	5 6	7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

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TABLE 3

AREA2 SOURCE DATA

APPORTIONING FACTORS FOR COMPUTER CALCULATED EMISSIONS

Source #	REGION	POLITICAL JURISDICATION	COUNTY	X COORDIN. KM.	Y COORDIN. KM	SOURCE AREA KM^2	STACK hgt. (ft.)	DOMESTIC			COMMERCIAL AND INSTITUTIONAL			
								A-1 COAL	A-2 OIL	A-3 NATL. GAS	A-4 COAL	A-5 RES. OIL	A-6 DIST. OIL	A-7 NATL. GAS
1 2 3 4	5 6 7	8 9	10 11 12 13 14 15 16 17	18 19 20 21 22	23 24 25 26 27 28	29 30 31 32 33	34 35 36 37	38 39 40 41 42 43	44 45 46 47 48 49	50 51 52 53 54 55	56 57 58 59 60 61	62 63 64 65 66 67	68 69 70 71 72 73	74 75 76 77 78 79

Source #	NON-POINT SOURCE INDUSTRIAL					OPEN		SOLVENT	VESSELS		DIESEL		GASOLINE MOTOR VEHICLES		
	A-8 COAL	A-9 RES. OIL	A-10 DIST. OIL	A-11 NATL. GAS	A-12 WOOD	A-13 BURNING	A-14 INCINER.	A-15 EVAPOR	A-16 DIESEL	A-17 RAILROAD	A-18 MOTOR VE	A-19 OTHER	A-20 25 M.P.H	A-21 45	A-22 OTHER

HAND CALCULATED EMISSIONS

PARTICULATE EMISSIONS (tons/yr)

	Vessels										Ink	Dry Clean.	Paint	Gas Hand.	Air-Craft
Source #	P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8	P-9	P 10	P 11	P-12	P-13	P-14	P-15

SO_x EMISSIONS (tons/yr)

Source #	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	S-9	S-10	S 11	S-12	S-13	S-14	S-15

CO EMISSIONS (tons/yr)

Source #	C 1	C-2	C-3	C 4	C 5	C 6	C 7	C-8	C-9	C-10	C-11	C-12	C-13	C-14	C-15

HYDROCARBON EMISSIONS (tons/yr)

Source #	H-1	H-2	H-3	H-4	H-5	H-6	H-7	H-8	H-9	H-10	H-11	H-12	H-13	H-14	H-15

NO_x EMISSIONS (tons/yr)

Source #	N-1	N-2	N-3	N-4	N-5	N-6	N-7	N-8	N-9	N-10	N-11	N 12	N-13	N-14	N-15
1 2 3 4	5 6 7 8 9	10 11 12 13 14	15 16 17 18 19	20 21 22 23 24	25 26 27 28 29	30 31 32 33 34	35 36 37 38 39	40 41 42 43 44	45 46 47 48 49	50 51 52 53 54 55	56 57 58 59 60	61 62 63 64	65 66 67 68 69	70 71 72 73 74	75 76 77 78

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Table 3.1 QUANTITY OF POINT SOURCE FUEL NOT INCLUDED ON COMPUTER LISTING AND CORRECTED REGIONAL TOTALS FOR POINT SOURCE FUEL USAGE

REGION	RESIDUAL OIL (1000 gal)		COAL (Tons)	
	Process not shown	Total including process not shown	Process not shown	Total including process not shown
079	0	74	0	5,598,594
103	0	668	16,838	3,407,588
124	0	100,826	0	2,175,081
173	40	9,270	249,996	3,398,793
174-01	0	8,990	1,469,999	3,845,060
174-02	0	23,823	1,964,994	4,373,475
174-03	0	2,440	3	2,953,764
174-04	0	175	0	0
174-05	0	0	0	0
174-06	0	3,790	19,295	2,111,291
174-07	0	0	0	0
174-08	0	12,279	250,420	598,947
175	0	7,910	5,810	535,375
176	0	111	0	1,163,416
177	0	14,641	0	546,090
178	99	59,671	10,000	2,856,451
179	0	0	347,333	8,578,414
180	700	1,590	80,056	283,548
181	0	3,540	1,237	10,093,418
182	0	752	0	446,619
183	250	500	164,738	2,671,329
TOTAL	1,089	251,050	4,580,719	55,637,344

corresponding source total entered on Figure 3.2 to calculate the quantity of fuel burned, refuse incinerated, etc. in the smaller unit.

This section of the report outlines both the procedures used for determining the quantity of material which was classified as contributing to area source emissions and the methods used to apportion these quantities to the smaller units. The alpha-numeric designations, such as A-8, in the following discussion refer to the fields identified in Figure 3.3.

3.2.1 Industrial Fuel

3.2.1.1. Coal - The statewide emission inventory provided detailed information on 5,345 point sources. A total of 13,127,000 tons of coal was consumed by the industrial point sources. It was assumed that this total represents approximately 90 percent of the coal used by all industrial sources in the state.[a] Thus, the total coal used by all industrial sources is:

$$\frac{13{,}127{,}000}{0.90} = 14{,}585{,}000 \text{ tons}$$

The coal used by industries considered as area sources was:

$$14{,}585{,}000 - 13{,}127{,}000 = 1{,}458{,}000 \text{ tons}$$

Area source industrial coal was apportioned to individual counties on the basis of manufacturing employees.

$$1{,}458{,}000 \text{ tons} \times \frac{\text{Manuf. Employees, County 1967}}{\text{Manuf. Employees, State 1967}} = \text{A-8}$$

NOTE: The "industrial fuel" as described above includes fuel used for process purposes which because of inventory format does not appear on fuel summaries.

3.2.1.2. Residual Oil - Bureau of Mines publications (Ref. 15) shows that 193,000,000 gallons of residual oil were used by all industrial sources in the state. From the emission inventory industries identified as point sources used 171,722,000 gallons. Thus the residual oil used by industrial area sources was:

---

[a] Such an assumption is typical of those employed in rapid survey techniques.

193,000,000 - 171,722,000 = 21,278,000 gallons

This was apportioned to individual counties by:

$$21,278,000 \times \frac{\text{Manuf. Employees, County 1967}}{\text{Manuf. Employees, State 1967}} = \text{A-9}$$

3.2.1.3. Distillate Oil - The total amount of distillate oil used by industries for 1970 was 140,100,000 gallons (Ref. 15). Industrial sources surveyed in the emission inventory used a total of 90,867,000 gallons. The difference of 49,233,000 gallons was apportioned to individual counties on the basis of manufacturing employees:

$$49,233,000 \times \frac{\text{Manuf. Employees, County 1967}}{\text{Manuf. Employees, State 1967}} = \text{A-10}$$

3.2.1.4. Natural Gas - Natural gas for industrial use was obtained by questionnaires sent to the natural gas distributors. This amount minus surveyed industrial point source natural gas was proportionately distributed by county and subsequently by region.

Example Region 173

Industrial Natural Gas Use	17977 MMCFY
Point Source Gas	7129
	10848 MMCFY

10848 MMCFY = A-11

NOTE: In some regions surveyed, natural gas usage exceeded known gas sales by gas companies. This sometimes occurred due to use of gas from wells owned by the company in question, but more likely is a misinterpretation of the gas quantity by the reporting company or data gatherer. In this instance no gas was smeared and indicates that further work is required to obtain reliable estimates.

3.2.2 Residential Fuel

3.2.2.1. Coal - The 1960 Census of Housing (Ref. 17) showed that 420,213 dwelling units in the state used coal for space heating. It was assumed that essentially no residences constructed since 1960 use coal for heating purposes. Thus the total coal used for residential space heating in the state is given by:

$$420{,}213 \times 0.0012 \times 5000 \times \frac{5.2}{5.0} = 2{,}620{,}000 \text{ tons (Ref. 18)}$$

Where:

0.0012 = Tons Coal per Degree Day (5.0 Rooms)
5000 = Average No. Degree Days Per Year
5.2 = Median No. Rooms Per Dwelling Unit

The 2,620,000 tons was apportioned to counties by:

$$2{,}620{,}000 \times \frac{\text{Dwelling Units using Coal in County 1960}}{\text{Dwelling Units using Coal in State 1960}} = \text{A-1}$$

3.2.2.2. Residential Distillate Oil - Distillate oil for residential use was calculated and distributed in the same manner as described in 3.2.2.1.

Average Degree Days = 5,000
Median Rooms/Dwelling Unit = 5.2
Dwelling Units Using Oil = 419,929
Gallons/Degree Day per 5.0 Rooms = .18

$$419{,}929 \times 0.18 \times 5000 \times \frac{5.2}{5.0} = 394{,}000{,}000 \text{ Gal.}$$

Similarly homes using oil for water heating	4,998,750
	398,998,570 Gal.

$$398{,}998{,}570 \times \frac{\text{Homes with Oil Use, County 1960}}{\text{Homes with Oil Use, State 1960}} = \text{A-2}$$

3.2.2.3. Residential Natural Gas - The amounts of natural gas used for residential purposes by county was obtained by questionnaires sent to gas distributors.

3.2.3 Commercial and Institutional Fuel Usage

3.2.3.1. Coal - Bureau of Mines publication (Ref. 11) does not provide estimates of total coal used by commercial and institutional sources. Thus, we first determined the total amount of coal used by all sources other than utilities from:

Retail Dealers - Ohio (Ref. 11)	1,888,000 tons
Coke & Gas Plants - Ohio (Ref. 11)	12,699,000
All Others - Ohio (Ref. 11)	15,643,000
All Coal Excluding Utility Use	30,230,000 tons

Next we deducted from this total the coal used for residential space heating and by industrial, governmental and institutional point sources. Thus:

All Coal Excluding Utility Use	30,230,000 tons
Residential Coal (3.2.2.1)	(-) 2,620,000
Industrial Coal (3.2.1.1)	(-) 14,585,311
Gov. & Institutional Point Source	(-) 1,946,475
Governmental & Commercial Area Sources	11,078,214 tons

This quantity of coal was apportioned to individual counties on the basis of number of retail and wholesale establishments as follows (Ref. 46):

$$11{,}078{,}214 \text{ X} \left[\frac{1}{2}\left(\frac{\text{County Retailers 1967}}{\text{State Retailers 1967}}\right) + \frac{1}{2}\left(\frac{\text{County Wholesalers 1967}}{\text{State Wholesalers}}\right)\right] = \text{A-4}$$

3.2.3.2. Residual Oil - The quantity of oil to be apportioned in a region was determined by deducting the C & I point source total from the Ohio State total (Ref. 15) and distributing as stated in 3.2.3.1.

Residual Oil Heating (Excluding Industrial) (Ref. 15)	18,950,000 gal.
Commercial & Institutional Point Source	16,671,000
	2,279,000 gal.

Apportionment (Ref. 46):

$$2{,}279{,}000 \text{ X} \left[\frac{1}{2}\left(\frac{\text{County Retailers 1967}}{\text{State Retailers 1967}}\right) + \frac{1}{2}\left(\frac{\text{County Wholesalers 1967}}{\text{State Wholesalers 1967}}\right)\right] = \text{A-5}$$

3.2.3.3. Distillate Oil - The quantity of oil to be apportioned in a region was determined by deducting the C & I point source total and residential distillate oil use from the state total of distillate oil and kerosene (Ref. 15) and distributing to counties as stated in 3.2.3.1.

Distillate Oil Heating (Ref. 15)	= 661,016,700 gal.
Kerosene Oil Heating (Ref. 15)	= 20,900,000
	681,916,700 gal.
Residential (3.2.2.2)	(-) 394,000,000
	287,916,700 gal.
Point Source (C & I)	(-) 533,000
	287,384,700 gal.

$$287{,}384{,}700 \times \left[\frac{1}{2}\left(\frac{\text{County Retailers 1967}}{\text{State Retailers 1967}}\right) + \frac{1}{2}\left(\frac{\text{County Wholesalers 1967}}{\text{State Wholesalers 1967}}\right)\right] = \text{A-6}$$

3.2.3.4. Natural Gas - The natural gas for C & I use, as given by the natural gas distributors minus surveyed C & I point source natural gas was proportionately distributed by county and subsequently by region.

Example Region 174

C & I Natural Gas Use	71974 MMCF
C & I Point Source	(-) 884
C & I Area Source	71090 MMCF

3.2.4 Solid Waste

Estimates of the amount of solid waste generated varied from 10 lb/person to 3 lb/person (Ref. 41) depending on the industrial character of the county. A sliding scale was developed which allows for various industrial densities. This factor was then multiplied by the population to determine the amount of generated waste.

Manufacturing Employees/County	Lbs/Day/Person
0 - 999	3
1,000 - 4,999	4
2,500 - 4,999	5
5,000 - 9,999	8
10,000 - 49,999	9
50,000 - Up	10

Example - Hamilton County

Manufacturing Employees = 146,438
Population = 924,018

$$924{,}018 \times \frac{10 \text{ lbs/day} \times 365}{2000} = 1{,}709{,}433 \text{ tons}$$

Similarly the amount of solid waste generated in Region 079 is:

079-12	Butler	375,504 tons/year
13	Clermont	70,833
14	Hamilton	1,709,433
15	Warren	62,845
		2,218,619 tons/year

The amount of solid waste known to be collected and burned or incinerated was determined from the Bureau of Solid Waste Management Report. The difference between that generated and collected was assumed to be land filled, open burned, or incinerated on site in the same ratios that were found in the solid waste report.

In Hamilton County, the solid waste survey reports that 903,365 tons of waste were collected. Of this amount, 43% was open burned and 42% was incinerated. Therefore it was assumed the uncollected amounts were disposed of in the same manner.

Hamilton County	Generated	1,709,433
	Collected	903,365
	Uncollected	806,068

Collected and Uncollected*-
Open Burned
1,709,433 X 43% = 752,150

Collected and Uncollected-
Incinerated
1,709,433 X 42% = 717,961

Similarly:

		Open Burned	Incinerated
079-12	Butler	135,181	30,040
13	Clermont	31,168	-
14	Hamilton	752,150	717,961
15	Warren	61	-
079 Region		918,560	748,001

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* Uncollected may include private haulers and dumps.

3.2.5 Solvent and Gasoline Evaporation

Gasoline for automobile use was given on a county basis by Ref. 42. On and off highway diesel fuel use and jet fuel use was given by Ref. 15 and 22. The evaporation from fuels other than gasoline was put on a gasoline equivalency basis by an appropriate formula. Those fuels were found to be equivalent to 24% of the volatility of gasoline based upon the Ried Vapor pressures. Fuels were apportioned as follows:

(a) Gasoline - by county is given in Ref. 42.

(b) Diesel Fuel - same ratio as gasoline.

(c) Jet Fuel - Apportioned in the counties according to the number of scheduled itinerant flights as given by Ref. 39 and questionnaires from 44 selected airports.

The emission factors accounted for all handling and storage operations.

3.2.5.1. Hydrocarbon Evaporation from Gasoline -

Cumulative Gasoline Emission Factors = lbs/1000g

1. Bulk Storage Losses Floating Roof
   0.1138 lb/1000 gal X 75% = .087

2. Bulk Storage Losses Fixed Roof
   1.12 lb/1000 gal X 25% = .28

3. Breathing Losses Floating Roof = 0.0

4. Breathing Losses Floating Roof at 50% Splash Fill (9.4 X 25%) = 2.35

SUBTOTAL-STORAGE ONLY 2.71

5. Bulk Vehicles Filling = 6.4

6. Service Station Tank Filling = 9.4

7. Automobile Tanks Filling = 11.6

SUBTOTAL-MARKETING 27.4 lb/1000 gal.

TOTAL GASOLINE EVAPORATION = 30.1 lb/1000 gal.

- Example - Cuyahoga County

$$691{,}120{,}000 \text{ gal. } X\left(\frac{30.1}{1000}\right) \Big/ 2000 \text{ lbs/ton} = 10{,}400 \text{ tons}$$

3.2.5.2. Hydrocarbon Evaporation from Diesel Fuel (Ref. 15) -

- Example - Cuyahoga County

$$302{,}000{,}000 \text{ gal. } X \frac{\text{Gasoline - County}}{\text{Gasoline - State}} =$$

$$302{,}000{,}000 \text{ gal. } X \frac{691{,}119{,}790}{4{,}644{,}746{,}530} = 45{,}000{,}000 \text{ gal.}$$

Equivalent Gasoline at 25% = 11,000,000
Use emissions from factors 1 thru 4 (Storage)

$$11{,}000{,}000 \text{ gal. } X\left(\frac{2.71}{1000}\right) \Big/ 2000 \text{ lbs/ton} = 14.9$$

3.2.5.3. Hydrocarbon Evaporation from Jet Fuel (Ref. 22) -

- Example - Cuyahoga County

Jet Fuel - United States = 7.8 X 10^9 gal.

$$7.8 \times 10^9 \times \frac{\text{Ohio Usage of Aviation Gasoline}}{\text{U.S. Usage of Aviation Gasoline}} = 240 \times 10^6 \text{ gal.}$$

Equivalent Gasoline at 25% = 60,000,000 gallons

$$60 \times 10^6 \times \frac{\text{County Aircraft Operations (Ref. 39)}}{\text{State Aircraft Operations (Ref. 39)}} = 14,880,000$$

Use emissions from items 6 and 7.

$$14,800,000 \times \frac{9.4 + 11.6}{1000} \quad 2000 \text{ lbs/ton} = 155 \text{ tons}$$

° Example Total Motor Fuel Evaporation - Cuyahoga County

Gasoline Storage and Marketing	10,400
Diesel Fuel Storage	15
Jet Fuel Storage and Marketing	155
	10,570 tons

3.2.6 Paint

The dollar value of paint sold in the United States is given in Ref. 44. The quantity of paint and hence the amount of contained solvents were determined on a national basis with knowledge of wholesale prices of each category. The Ohio and region shares of the paint solvent emissions were apportioned on the basis of capital investments (this should be a good indicator of new product usage).

Total U.S. paint dollars - sales are \$2710 X 10^6. By various ratios of vehicle to pigment and cost per gallon the emissions of hydrocarbon were determined to be 449 tons/MM$.

Ohio Apportionment

$$\$2710 \times 10^6 \times \frac{\text{Capital Expenditures, Ohio}}{\text{Capital Expenditures, USA}} = \$124 \times 10^6$$

$$\$124 \times 10^6 \times 449 \text{ tons/MM} = 55{,}500 \text{ tons}$$

$$55{,}500 \text{ tons} \times \frac{\text{Cost of Materials Produced, Country}}{\text{Cost of Materials Produced, State}}$$

- Example - Adams County

$$55{,}500 \times 2/21589 = 6 \text{ tons}$$

3.2.7 Ink

The dollar value of ink sold in the United States is given in Ref. 44. The quantity and hence the amount of contained solvents was determined by taking an averaged value of 30¢/lb. of ink. The Ohio and region shares of solvent emissions were apportioned by the dollars of business receipts to employees of the advertising, new services, business consulting services, etc. in each county (Ref. 37).

Total U.S. ink dollar sales are $\$367 \times 10^6$. Although ink prices vary from 6¢ to $4.00 a pound, it is thought that 30¢/lb represents the common lithograph ink used most widely.

Ohio Apportionment
(Receipts from Miscellaneous Services - all Ref. 37)

$$367 \times 10^6 \times \frac{870{,}437{,}000, \text{(State)}}{15{,}192{,}622{,}000, \text{(U.S.)}} = \$21.02 \times 10^6$$

Hydrocarbon Determination

$$\frac{\$21.02 \times 10^6 \times 40\% \text{ (Volatile)}}{30¢/\text{lb.} \times 2000 \text{ lb/ton}} = 14{,}000 \text{ tons}$$

(Establishments with payroll only, Ref. 37)

- Example - Allen County

$$14{,}000 \text{ tons} \times \frac{3605 \text{ (County)}}{813{,}992{,}000 \text{ (State)}} = 62 \text{ tons}$$

NOTE: The point source survey undoubtedly contains some of the same hydrocarbon emissions (See Table 3.2). No attempt was made to deduct the point source totals.

3.2.8 Dry Cleaning Solvent

The quantity of dry cleaning solvent was apportioned on a population basis at 2.7 lbs. of hydrocarbon per person.

Example - Allen County

$$\frac{111{,}144 \text{ persons} \times 2.7 \text{ lb/capita}}{2000 \text{ lb/ton}} = 150 \text{ tons}$$

3.2.9 Automobile

Automobile vehicle mileage was obtained from the product of gasoline sales (per county) times 96.8% (gasoline for highway use as per U.S. Department of Transportation - Ref. 22) times an average of 14.4 miles per gallon. Vehicle speed was proportioned according to the percent of the population that is rural or urban with an average speed of 45 MPH for the former and 25 MPH for the latter. Note that recent traffic counts were not available for the Cleveland counties.

Table 3.2 SOURCES OF POINT SOURCE HYDROCARBON LOSSES

Region number	Hydrocarbon, tons/year				
	Paint & paint solvent[2] 70% reactive	Printing 100% reactive	Cleaning solvent chlorinated	All others including process losses	Total
079[1]	3,217		572	12	3,801
103				13,281	13,281
124	1,293	88	67	35,518	36,966
173	5,242	3,460	231	4,068	13,001
174	15,725	1,400	6,336	23,971	47,432
175	6,464	31	282	3,812	10,589
176	507	122	31	16,330	16,990
177	2,372	25	258	38,019	40,674
178	4,548	144	29	2,874	7,595
179	23	-	-	841	864
180	3,807	1,716	11	4,512	10,046
181	46	10		1,399	1,455
182	24			384	408
183	4,048	98	46	3,036	7,228
TOTAL	47,316	7,094	7,863	148,057	210,330

1) Interpreted from Cincinnati Air Pollution Control Records.
2) Note that paint thinners would not be specified in Ref. 44.

- Example - Allen County

3.2.9.1. Gasoline Sales - (Ref. 42) = 51,923,620

Percent Urban Population (Census) 69%

Vehicle Miles (@ 25 MPH) =
51,923,620 gal. X .968 X .69 X 14.4 MPG= 499,403,869

3.2.9.2. Diesel - Sales of diesel fuel in the state were obtained from Ref. 15. This fuel was apportioned by region in the same ratio as gasoline sales. Both on and off highway diesels are included.

- Example:

On Highway Use of Diesel Fuel	33,200,000
Off Highway Use of Diesel Fuel	16,300,000
	49,500,000 gal.

- Example - Allen County

$$49{,}500{,}000 \times \frac{51{,}923{,}620 \text{ gasoline, County}}{4{,}664{,}746{,}530 \text{ gasoline, State}} = 544{,}500 \text{ gal.}$$

3.2.10 Railroads

Sales of railroad fuel oil were given by state in Ref. 15 and the fuel was apportioned by region in the same ratio as railroad employees in that region. Usage of distillate and residual oil was kept separate with appropriate emission factors used.

Ohio Railroad Usage of Distillate Oil	14,800,000 gal.
Ohio Railroad Usage of Residual Oil	907,000 gal.

- **Example - Allen County, Distillate**

$$14,800,000 \times \frac{2,708 \text{ Employees, County}}{229,520 \text{ Employees, State}} = 174,618 \text{ gal.}$$

(Ref. 29)

3.2.11 Vessels

3.2.11.1. Ohio River Traffic - The number of trips by powered vehicles times the average miles for trip (Ref. 28) gave total miles of powered travel on the Ohio River. The gallons per mile, averaged between up and downstream, were multiplied by mileage to get total gallons of diesel fuel. The length of river frontage of any one county divided by total Ohio River length times the total river fuel usage gave gallons of fuel in a county. The quantity was then divided in half to account for Ohio's portion of emissions.

Total Trips per Year on Ohio River	30,884
Average Miles Per Trip (Ref. 28)	221
Total River Miles Powered Vessels	6,825,364
Average Miles per Gallon (50% Upstream)	12.15
Gallons of Fuel	82,928,172
Length of Ohio River - Miles	981
Apportionment, Example - Jefferson County	

$$\text{Total gal.} \times \frac{\text{River Length, Jefferson County}}{\text{River Length Total}} =$$

$$82{,}928{,}172 \text{ gal.} \times \frac{31 \text{ miles}}{981 \text{ miles}} = \quad 2{,}620{,}564$$

The quantity of fuel applicable to Ohio and not to West Virginia = 1,310,282 gal.

3.2.11.2. Lake Traffic - Vessel emission on the Great Lakes comes from both vessels underway and at dockside.

a) Vessels Underway - The average registered vessel horsepower and engine fuel was determined from Ref. 38. The tonnage of the five main categories of freight and the mileage from harbor entrance to the unloading points was determined from Ref. 38. After determination of average vessel speed, the number of horsepower hours by category of freight was determined for each harbor. Emission factors (Ref.45) were used for the appropriate fuel as discussed above.

Average Vessel Horsepower and Fuel Use (Ref. 38)

Total Registered Horsepower of Coal Burning Ships	331,237
Total Registered Horsepower of Diesel Ships	516,077
Total Registered Horsepower of Oil Burning Ships	733,985
Total Number of Ships	488

Average Horsepower	3,241
Average Harbor Speed - MPH	5
Total Registered Capacity - ore, coal and grain vessels - ft.^3	197,357,437
Total Registered Ships - ore, coal and grain vessels	312
Coal Storage Factor, $\text{ft.}^3/\text{ton}$	42

Vessels are used for several cargoes (i.e., coal,ore, and grain).

- Example Calculation of Average Vessel Capacity - Coal Usage Only

$$\frac{197,357,437 \text{ ft.}^3}{42 \text{ ft.}^3/\text{ton X } 312 \text{ ships}} = 15,000 \text{ tons}$$

Similarly, vessel tonnage when used for other uses was found to be:

Grain Tonnage	11,300
Ore Tonnage	43,350
Sand and Gravel Only - Self Unloaders = tonnage	31,600
Package and Bulk Only = tonnage	890

- Example Port - Toledo

Ore Tonnage, 1969 (Ref. 28)	5,602,253
Miles to Interlake Steel Dock from 1 mile outside Harbor Entrance	2.92
Miles to Lake Front Dock	1.11
Total Ore Movements	5,602,253 tons
Interlake Ore Movements(from questionnaire)	782,925 tons
	4,819,328 tons

Interlake Horsepower hours -
Ore Vessels only

$$\frac{782{,}925 \text{ tons}}{43{,}350 \text{ tons/trip}} \times \frac{2.92 \text{ miles/trip}}{5 \text{ miles/hour}} \times$$

3241 avg. H.P./Ship = 34,000

Similarly - for all other ore deliveries 80,000

Total Horsepower Hours 114,000

From above references, 46% of vessel shaft horespower is external combustion oil.

114,000 H.P. hours X 46% X 2* = 104,600 HP-Hours

Multiply by appropriate emission factors for oil usage and proceed to determine emissions for the fraction of horsepower hours other than external oil.

b) Vessels in Berth - The average vessel capacity (Ref. 38) and loading and unloading speeds of dock facilities (Ref. 38) were used to determine minimum dock side hours for each type of freight in each harbor. The dock side hours times the emission factor as set out in the emission factor book were used on the appropriate fuel as discussed above.

Example - Toledo Port Facilities

Average Unloading Speed - Coal 3,000 tons/hour

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* H.P. hours were multiplied by 2 to account for two way trip.

Average Unloading Speed - Ore	1,200 tons/hour
Average Unloading Speed - Grain	950 tons/hour
Average Unloading Speed - Gravel	300 tons/hour
Average Unloading Speed - Package Freight	100 tons/hour

Dock Side Hours at Lakefront Ore Dock

$$\frac{4{,}819{,}382 \text{ tons/yr.}}{1{,}200 \text{ tons/hr.}} = 4{,}020$$

Multiply by appropriate emission factor oil usage for appropriate percentage and for other fuels in percentages determined above.

Apportionment -

Assign emissions to the appropriate county or in case of gridded area into the grids in which the activity takes place.

3.2.12 Aircraft

Questionnaires returned by forty-four selected airports and FAA statistics (Ref. 39) were used to determine take off and landing operations for each kind of aircraft. The number of operations times the appropriate emission factor gave the emissions per county.

4.0 AREA GRIDDING

Grid systems using the Universal Transverse Mercator System were prepared for the entire Cleveland Region.

All grid systems used 2.5, 5.0 and 10.0 square kilometer grids (Fig. 2.3). The coordinates given for a grid were of the middle of the grid. The total grids in the region were 351.

4.1 Area Source Apportionment

The factors used for apportioning residential fuel, open burning, incineration, fuel evaporation, and vehicle mileage were based on population densities.

The factors for industrial, governmental and institutional fuel, railroad fuels, and "others" category were based on knowledge of the area and prior surveys.

5.0 EMISSIONS INVENTORY DATA

Point and area source emissions are summarized by region in Tables 5.1 through 5.14. Data in these tables are based on information in the point and area source computer print outs, and data gathered from various references.

Figures 5.1 through 5.14 show for each of the AQCR's, the percent of emissions due to each of the following sources.

1. Residential Fuel - Area Source
2. Commercial, Institutional and Industrial - Point Source (Excludes Steam-Electric Power Plant)
3. Fuel Combustion - Steam-Electric Power Plants
4. Process Losses - Point Sources
5. Solid Waste Disposal - Point and Area Sources
6. Transportation - Gasoline Motor Vehicles
7. Transportation - All Other Vehicles
8. Miscellaneous.

Table 5.1 EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Metropolitan Cincinnati Interstate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	2551	6058	7971	1913	797	318854	T/Y
2. Distillate Oil	306	441	153	92	367	61206	G/Y
3. Natural Gas	414	13	436	174	1634	43577	MCF/Y
4. Wood							
5. Other							
6. TOTAL	3271	6512	8560	2179	2798		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	32647	34113	37859	9136	5211		
b Bituminous Coal-Pt. Source	26500	24928	967	392	12070		
2. Coke							
3.a Distillate Oil-Area Source	342	921	5	69	1368		
b Distillate Oil-Pt. Source	1	1	0	0	1		
4.a Residual Oil-Area Source	36	248	1	4	93		
b Residual Oil-Pt. Source	1	6	0	0	2		
5.a Natural Gas-Area Source	549	18	237	827	5075		
b Natural Gas-Pt. Source	1	5	1	8	36		
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	2368	6075	31	12	1130		
8. TOTAL	62449	66315	39101	10448	24986		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	55490	196664	2098	637	37393		
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas	142	4	2	219	1160		
6. Other							
7. TOTAL	55632	196668	3000	856	38553		
D. TOTAL FUEL COMBUSTION	121352	269495	50661	13483	66337		
II. PROCESS LOSSES							
A. Point Sources	14300	15444	994	7082	30		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source							
1.b On Site-Point Source	2795	599	3993	1198	1198	798675	T/Y
B. Open Burning							
1. On Site-Area Source	7348	459	39039	13778	2756	918560	T/Y
C. TOTAL SOLID WASTE DISPOSAL	10143	1058	43032	14976	3954		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	2498	1514	743971	114516	76952		
Motor Vehicles-Diesel	72	129	935	187	978		
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	234	843	3480	251	128		
D. Railroad	23	66	67	48	71		
E. Vessels	64	165	178	127	191		
F. Gasoline Hndlg. Evap. Losses				7665			
G. Other							
H. TOTAL TRANSPORTATION	2891	2717	748631	122794	78320		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				13024			
C. TOTAL MISCELLANEOUS				13024			
VI. GRAND TOTAL							
A. AREA SOURCE	47084	44988	834332	161811	95621		
B. POINT SOURCE	101602	243726	8986	9548	53020		
C. TOTAL	148686	288714	843318	171359	148641		

Table 5.2 EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Huntington-Ashland-Portsmouth-Ironton Interstate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	1151	2733	3596	863	360		
2. Distillate Oil	52	75	26	16	62		
3. Natural Gas	42	1	45	18	167		
4. Wood							
5. Other							
6. TOTAL	1245	2809	3667	897	589		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	4987	4340	5274	1269	616		
b Bituminous Coal-Pt. Source	4790	9451	130	50	1903	203324	TPY
2. Coke							
3.a Distillate Oil-Area Source	44	118	1	9	176		
b Distillate Oil-Pt. Source	17	34	0	2	54	1860	MGY
4.a Residual Oil-Area Source	2	17	0	0	6		
b Residual Oil-Pt. Source	0	0	0	0	0	668	MGY
5.a Natural Gas-Area Source	14	0	15	6	56		
b Natural Gas-Pt. Source	43	1	1	96	421	4830	MMCFY
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	551	592	18	886	6015		
8. TOTAL	10448	14553	5439	2318	9247		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	17462	244379	1594	478	45725	3187426	TPY
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas							
6. Other							
7. TOTAL	17462	244379	1594	478	45725		
D. TOTAL FUEL COMBUSTION	29155	261741	10700	3693	55561		
II. PROCESS LOSSES							
A. Point Sources	15751	2709	70649	7293	2072		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	0	0	0	0	0		
1.b On Site-Point Source	12	0	35	5012	1	281*	TPY
B. Open Burning							
1. On Site-Area Source	805	50	4279	1510	302		
C. TOTAL SOLID WASTE DISPOSAL	817	50	4314	6522	303		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	427	259	104946	18743	14103		
Motor Vehicles-Diesel	12	22	162	32	169		
B. Off Highway Fuel Usage							

* Number Incomplete

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft							
D. Railroad	4	12	12	8	13		
E. Vessels	230	592	643	460	689		
F. Gasoline Hndlg. Evap. Losses				1549			
G. Other							
H. TOTAL TRANSPORTATION	673	885	105763	20792	14974		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				664			
C. TOTAL MISCELLANEOUS				664			
VI. GRAND TOTAL							
A. AREA SOURCE	7770	8219	118999	25147	16719		
B. POINT SOURCE	38626	257166	72427	13817	56191		
C. TOTAL	46396	265385	191426	38964	72910		

Table 5.3 EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Metropolitan Toledo Interstate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	558	1324	1742	418	174		
2. Distillate Oil	170	244	85	51	204		
3. Natural Gas	260	8	274	110	1028		
4. Wood							
5. Other							
6. TOTAL	988	1576	2101	579	1306		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	17426	14101	15860	3826	2133		
b Bituminous Coal-Pt. Source	8559	9449	262	125	2286	301191	TPY
2. Coke							
3.a Distillate Oil-Area Source	142	381	2	29	567		
b Distillate Oil-Pt. Source	8	176	3	22	111	14500	MGY
4.a Residual Oil-Area Source	13	96	0	2	36		
b Residual Oil-Pt. Source	1096	12430	10	144	2835	95618	MGY
5.a Natural Gas-Area Source	90	3	95	38	357		
b Natural Gas-Pt. Source	547	26	18	1610	7092	81356	MCF
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	29	7523	170	61	277		
8. TOTAL	27910	44185	16420	5857	15694		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal	0	0	0	0	0		
2. Bituminous Coal	2694	81840	1043	210	18341	377800	TPY
3. Distillate Oil	2	7	0	0	0	226	MGY
4. Residual Oil	21	363	0	13	273	5208	MGY
5. Natural Gas	0	0	0	0	0		MMCFY
6. Other	0	1467	0	0	0		
7. TOTAL	2717	83677	1043	223	18614		
D. TOTAL FUEL COMBUSTION	31615	129438	19564	446	35614		
II. PROCESS LOSSES							
A. Point Sources	12461	30724	1329	36904	341		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	1088	233	1555	446	466		
1.b On Site-Point Source	3	1	5	1	3	2481	
B. Open Burning							
1. On Site-Area Source	198	12	1052	372	74		
C. TOTAL SOLID WASTE DISPOSAL	1289	246	2612	819	543		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	1140	691	344807	57428	34890		
Motor Vehicles-Diesel	33	59	429	86	449		
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft							
D. Railroad	14	39	38	28	41		
E. Vessels	59	503	38	19	73		
F. Gasoline Hndlg. Evap. Losses				3790			
G. Other							
H. TOTAL TRANSPORTATION	1246	1292	345312	61351	35453		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				5420			
C. TOTAL MISCELLANEOUS							
VI. GRAND TOTAL							
A. AREA SOURCE	21191	17694	365977	72063	40392		
B. POINT SOURCE	25420	144006	2840	39313	31559		
C. TOTAL	46611	161700	368814	111376	71951		

Table 5.4 EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Dayton Intrastate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	1147	2723	3583	860	358	143314	T/Y
2. Distillate Oil	218	314	109	65	262	43611	G/Y
3. Natural Gas	444	14	467	187	1752	46714	MCF/Y
4. Wood							
5. Other							
6. TOTAL	1809	3051	4159	1112	2372		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	28679	22096	23419	5660	3488		
b Bituminous Coal-Pt. Source	9627	13369	476	187	4677	568755	TPY
2. Coke							
3.a Distillate Oil-Area Source	220	594	3	44	881		
b Distillate Oil-Pt. Source	3	13	0	0	20	692	
4.a Residual Oil-Area Source	28	195	1	3	74		
b Residual Oil-Pt. Source	6971	81771	61	909	18187	606230	
5.a Natural Gas-Area Source	256	8	168	284	1573		
b Natural Gas-Pt. Source	65	1	2	142	621	7061	
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source							
8. TOTAL	45849	118047	24130	7229	29521		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	39171	82804	2033	907	20992	2580024	
3. Distillate Oil	22	30		4	89	2954	
4. Residual Oil							
5. Natural Gas	7			19	94	939	
6. Other							
7. TOTAL	39200	82834	2033	930	21175		
D. TOTAL FUEL COMBUSTION	86858	203932	30322	9271	53068		
II. PROCESS LOSSES							
A. Point Sources	3998	2678	11897	12936	7528		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	814	174	1163	349	349	232666	T/Y
1.b On Site-Point Source	219	24	32	26	35	32350	TPY
B. Open Burning							
1. On Site-Area Source	855	53	4542	1603	321	106864	T/Y
C. TOTAL SOLID WASTE DISPOSAL	1888	251	5737	1978	705		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	2804	1699	753244	130413	89887		
Motor Vehicles-Diesel	28	50	364	73	381		
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	9	21	161	8	8		
D. Railroad	13	36	36	25	38		
E. Vessels							
F. Gasoline Hndlg. Evap. Losses				7160			
G. Other							
H. TOTAL TRANSPORTATION	2854	1806	753805	137679	90314		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				10053			
C. TOTAL MISCELLANEOUS				10053			
VI. GRAND TOTAL							
A. AREA SOURCE	35515	27977	787260	150015	99372		
B. POINT SOURCE	60083	180690	14501	15130	52243		
C. TOTAL	95598	208667	801761	165145	151615		

Table 5.5 EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Greater Metropolitan Cleveland Intrastate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	3580	8502	11187	2685	1119		
2. Distillate Oil	403	580	201	121	484		
3. Natural Gas	1906	60	2006	802	7522		
4. Wood							
5. Other							
6. TOTAL	5889	9142	13394	3608	9125		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	104884	82143	88875	21467	12782		
b Bituminous Coal-Pt. Source	58497	215730	3165	1853	48384	3966275	TON/YR
2. Coke							
3.a Distillate Oil-Area Source	821	2311	11	165	3284		1000
b Distillate Oil-Pt. Source	112	594	6	39	574	27031	GAL/YR
4.a Residual Oil-Area Source	96	669	3	13	252		1000
b Residual Oil-Pt. Source	572	4929	4	77	1542	51407	GAL/YR
5.a Natural Gas-Area Source	675	21	711	284	2666		
b Natural Gas-Pt. Source	732	164	29	1589	7068	59128	MMCF
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	2109	21557	44	398	336		
8. TOTAL	168498	328118	92848	25885	76888		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	30960	349602	3700	2003	78275	6210051	
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas	16	0	0	36	157	1800	
6. Other							
7. TOTAL	30976	349602	3700	2039	78432		
D. TOTAL FUEL COMBUSTION	205363	685862	109942	31532	164445		
II. PROCESS LOSSES							
A. Point Sources	45151	31175	184477	47753	1001		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	3290	705	4701	1410	1410		
1.b On Site-Point Source	1307	81	550	127	153	132112	TONS/YR
B. Open Burning							
1. On Site-Area Source	7992	500	42460	14986	2997		
C. TOTAL SOLID WASTE DISPOSAL	12589	2016	47711	16523	4560		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	6336	3841	1927516	320465	193482		
Motor Vehicles-Diesel	188	339	2446	489	2559		
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	1226	866	6457	2446	742		
D. Railroad	66	183	185	132	197		
E. Vessels	196	1773	123	67	176		
F. Gasoline Hndlg. Evap. Losses				1500			
G. Other							
H. TOTAL TRANSPORTATION	8012	19002	1936727	345099	197156		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				27757			
C. TOTAL MISCELLANEOUS				27757			
VI. GRAND TOTAL							
A. AREA SOURCE	131659	102493	2086882	414789	229672		
B. POINT SOURCE	139456	624562	191975	53875	137490		
C. TOTAL	271115	727055	2278857	468664	367162		

Table 5.6 EMISSIONS INVENTORY SUMMARY

For the State of Ohio
Mansfield-Marion Intrastate Air Quality Control Region
Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	1203	2857	3760	902	376	150388	T/Y
2. Distillate Oil	96	138	48	29	115	19232	G/Y
3. Natural Gas	153	5	161	64	604	16118	MCF/Y
4. Wood							
5. Other							
6. TOTAL	1452	3000	3969	995	1095		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	14556	11369	12260	2962	1774		
b Bituminous Coal-Pt. Source	10385	25069	475	222	3049	415172	
2. Coke							
3.a Distillate Oil-Area Source	114	306	1	23	454		
b Distillate Oil-Pt. Source	9	29	0	1	33	1146	
4.a Residual Oil-Area Source	13	94	0	2	35		
b Residual Oil-Pt. Source	91	616	1	12	237	7910	
5.a Natural Gas-Area Source	62	2	65	26	244		
b Natural Gas-Pt. Source	5443	177	5511	2677	22718	574347	
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	3	0	0	42	2		
8. TOTAL	30676	37662	18313	5967	28546		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	746	6915	58	19	965	108583	
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas							
6. Other							
7. TOTAL	746	6915	58	19	965		
D. TOTAL FUEL COMBUSTION	32874	47577	22340	6981	30606		
II. PROCESS LOSSES							
A. Point Sources	25811	24	4708	7652	70		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	0	0	0	0	0		
1.b On Site-Point Source	2098	130	1248	3896	774	19110	TPY
B. Open Burning							
1. On Site-Area Source	2785	174	14793	5221	1044	348072	T/Y
C. TOTAL SOLID WASTE DISPOSAL	4883	304	15041	9117	1818		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	1023	620	266958	46672	33105		
Motor Vehicles-Diesel	30	53	385	77	403	2371	G/Y
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	1	4	25	1	1		
D. Railroad	7	22	21	15	22		
E. Vessels							
F. Gasoline Hndlg. Evap. Losses				3280			
G. Other							
H. TOTAL TRANSPORTATION	1061	699	267389	50045	33531		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				3954			
C. TOTAL MISCELLANEOUS				3954			
VI. GRAND TOTAL							
A. AREA SOURCE	20043	15644	298477	63228	38177		
B. POINT SOURCE	44586	32960	12001	14521	27848		
C. TOTAL	64629	48604	310478	77749	66025		

Table EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Metropolitan Columbus Intrastate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	1767	4196	5522	1325	552	220866	T/Y
2. Distillate Oil	142	205	71	43	171	28449	G/Y
3. Natural Gas	472	15	497	199	1863	49683	MCF/Y
4. Wood							
5. Other							
6. TOTAL	2381	4416	6090	1567	2586		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	29579	24304	27810	6704	3627		
b Bituminous Coal-Pt. Source	22288	30534	647	318	5227	682893	TPY
2. Coke							
3.a Distillate Oil-Area Source	245	659	3	49	978		
b Distillate Oil-Pt. Source	38	104	0	7	148	4945	MGY
4.a Residual Oil-Area Source	22	105	1	2	57		
b Residual Oil-Pt. Source	1	7	0	0	3	111	MGY
5.a Natural Gas-Area Source	190	6		80	751		
b Natural Gas-Pt. Source	153	6	53	337	1563	17142	MMCFY
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	191	6	4	425	1275		
8. TOTAL	52707	55776	28718	7922	13629		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal	274	472	16	1	280	70000	TPY
2. Bituminous Coal	19617	24613	191	57	4659	381000	TPY
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas							
6. Other							
7. TOTAL	19891	25058	207	58	4939		
D. TOTAL FUEL COMBUSTION	77584	85362	35027	15330	22983		
II. PROCESS LOSSES							
A. Point Sources	9877	1861	3491	10526	191		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	0	0	0	0	0		
1.b On Site-Point Source	442	38	2055	6038	407	250*	TPY
B. Open Burning							
1. On Site-Area Source	1885	118	10014	3534	707	235626	T/Y
C. TOTAL SOLID WASTE DISPOSAL	2327	156	12069	9572	1114		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	2330	1412	680585	114621	72364		
Motor Vehicles-Diesel	67	121	872	174	912		
B. Off Highway Fuel Usage							

* Number Incomplete

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	441	513	3491	955	247		
D. Railroad	20	58	57	41	62		
E. Vessels							
F. Gasoline Hndlg. Evap. Losses				8350			
G. Other							
H. TOTAL TRANSPORTATION	2858	2104	685005	124141	73585		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				8542			
C. TOTAL MISCELLANEOUS				8542			
VI. GRAND TOTAL							
A. AREA SOURCE	37160	31757	729123	144619	82291		
B. POINT SOURCE	52881	57641	5457	17709	13753		
C. TOTAL	90041	89399	735580	162328	96044		

Table 5.8 EMISSIONS INVENTORY SUMMARY
For the State of Ohio
Northwest Ohio Intrastate Air Quality Control Region
Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	1662	3948	5194	1247	519		
2. Distillate Oil	242	348	121	72	290		
3. Natural Gas	201	6	212	85	795		
4. Wood							
5. Other							
6. TOTAL	2105	4302	5527	1404	1604		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	20328	16620	18914	4560	2490		
b Bituminous Coal-Pt. Source	7351	13648	361	138	2118	292166	TPY
2. Coke							
3.a Distillate Oil-Area Source	167	450	2	33	668		
b Distillate Oil-Pt. Source	8	40	0	0	34	1160	MGY
4.a Residual Oil-Area Source	16	106	0	2	40		
b Residual Oil-Pt. Source	120	280	1	17	355	14641	MGY
5.a Natural Gas-Area Source	86	3	91	37	341		
b Natural Gas-Pt. Source	103	2	10	219	987	11814	MMCFY
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	1319	1634	102	114	741		
8. TOTAL	29498	32783	19481	5120	7774		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	11105	13209	171	69	2153	253924	TPY
3. Distillate Oil	12	47	0	3	48	1613	MGPY
4. Residual Oil							
5. Natural Gas	1135	45	30	3028	15137	151375	
6. Other							
7. TOTAL	12252	13301	201	3100	17338		
D. TOTAL FUEL COMBUSTION	43855	40386	25209	9624	26716		
II. PROCESS LOSSES							
A. Point Sources	93643	8906	284032	37814	2036		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	114	24	163	49	49		
1.b On Site-Point Source	55	4016	89	56	112	429116	TPY
B. Open Burning							
1. On Site-Area Source	2473	155	13140	4638	928		
C. TOTAL SOLID WASTE DISPOSAL	2642	4195	13392	4743	1089		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	1303	790	331082	58439	42589		
Motor Vehicles-Diesel	36	64	464	93	485		
B. Off Highway Fuel Usage	2	6	35	3	3		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft							
D. Railroad	10	27	27	19	29		
E. Vessels							
F. Gasoline Hndlg. Evap. Losses				19560			
G. Other							
H. TOTAL TRANSPORTATION	1351	887	331608	78114	43106		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent							
C. TOTAL MISCELLANEOUS							
VI. GRAND TOTAL							
A. AREA SOURCE	26640	22547	369445	88837	49226		
B. POINT SOURCE	114851	41827	284796	41458	23721		
C. TOTAL	141491	64374	654241	130295	72947		

Table 5.9 EMISSIONS INVENTORY SUMMARY
For the State of Ohio
Northwest Pennsylvania-Youngstown Interstate Air Quality Control Region
Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	1705	4048	5327	1278	533		
2. Distillate Oil	132	190	66	40	158		
3. Natural Gas	226	7	238	95	893		
4. Wood							
5. Other							
6. TOTAL	2063	4245	5631	1413	1584		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	18335	14159	15054	3638	2231		
b Bituminous Coal-Pt. Source	47992	73783	824	275	11048	1325131	TONS/YR
2. Coke							
3.a Distillate Oil-Area Source	141	381	2	28	565		
b Distillate Oil-Pt. Source	753	2527	10	147	2954	98984×10^3	GAL/YR
4.a Residual Oil-Area Source	17	124	0	2	47		
b Residual Oil-Pt. Source	685	2660	6	89	1387	59572×10^3	
5.a Natural Gas-Area Source	54	2	56	23	212		
b Natural Gas-Pt. Source	582	20	14	1289	5654	62876	MMCF
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	441	9801	138	103	2390		
8. TOTAL	69000	103457	16104	5594	26488		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	17675	10988	756	247	24157	1512402	TONS/YR
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas							
6. Other							
7. TOTAL	17675	110988	756	247	24157		
D. TOTAL FUEL COMBUSTION	88738	218690	22491	7254	52229		
II. PROCESS LOSSES							
A. Point Sources	64654	1574	43137	11470	168		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	767	164	1096	329	329		
1.b On Site-Point Source	356	35	546	242	85	58274	TONS/YR
B. Open Burning							
1. On Site-Area Source	957	60	5087	1795	359		
C. TOTAL SOLID WASTE DISPOSAL	2080	259	6729	2366	773		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	1274	772	363998	61755	39950		
Motor Vehicles-Diesel	37	67	483	97	505		
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	526	726	2863	3059	802		
D. Railroad	14	37	37	27	40		
E. Vessels	24	103	14	7	29		
F. Gasoline Hndlg. Evap. Losses				4250			
G. Other							
H. TOTAL TRANSPORTATION	1875	1705	367395	69195	41326		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				6655			
C. TOTAL MISCELLANEOUS				6655			
VI. GRAND TOTAL							
A. AREA SOURCE	24209	20840	394321	83078	46653		
B. POINT SOURCE	133138	201388	45431	13862	47843		
C. TOTAL	157347	222228	439752	96940	94496		

Table 5.10 EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Parkersburg-Marietta Interstate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	558	1324	1742	418	174		
2. Distillate Oil	13	18	6	4	15		
3. Natural Gas	42	1	44	18	165		
4. Wood							
5. Other							
6. TOTAL	613	1343	1792	440	354		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	3690	3205	3886	936	456		
b Bituminous Coal-Pt. Source	1504	7119	426	109	1514	132313	T/YR
2. Coke							
3.a Distillate Oil-Area Source	32	87	0	6	130		
b Distillate Oil-Pt. Source	0	0	0	0	0	5	MGY
4.a Residual Oil-Area Source	1	13	0	0	5		
b Residual Oil-Pt. Source	0	0	0	0	1	25	MGY
5.a Natural Gas-Area Source	35	2	20	44	234		
b Natural Gas-Pt. Source	9	0	0	20	88	1010	MCF
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	15	1	1	1	5		
8. TOTAL	5286	10427	4333	1116	2433		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	254745	733300	4415	3023	121455	8098768	
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas							
6. Other							
7. TOTAL	254745	733300	4415	3023	121455		
D. TOTAL FUEL COMBUSTION	260644	745072	10540	4579	124242		
II. PROCESS LOSSES							
A. Point Sources	43823	166	64	824	1		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	0	0	0	0	0		
1.b On Site-Point Source	49	1	6231	39	8	875	T/YR
B. Open Burning							
1. On Site-Area Source	850	53	4516	1594	319		
C. TOTAL SOLID WASTE DISPOSAL	899	54	10747	1633	327		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	1289	781	387519	64663	39547		
Motor Vehicles-Diesel	8	15	107	21	112		
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft							
D. Railroad	2	7	7	5	7		
E. Vessels	113	296	319	228	341		
F. Gasoline Hndlg. Evap. Losses				950			
G. Other							
H. TOTAL TRANSPORTATION	1412	1099	387952	65867	40007		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				601			
C. TOTAL MISCELLANEOUS				601			
VI. GRAND TOTAL							
A. AREA SOURCE	6633	5802	398166	69438	41505		
B. POINT SOURCE	300145	740587	11137	4016	123072		
C. TOTAL	306778	746389	409303	73504	164577		

Table 5.11 EMISSIONS INVENTORY SUMMARY
For the State of Ohio
Sandusky Intrastate Air Quality Control Region
Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	514	1220	1605	385	160		
2. Distillate Oil	75	109	38	23	90		
3. Natural Gas	106	3	111	45	418		
4. Wood							
5. Other							
6. TOTAL	695	1332	1754	453	668		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	9035	7244	8072	1948	1103		
b Bituminous Coal-Pt. Source	941	4206	92	42	605	81594	T/YR
2. Coke							
3.a Distillate Oil-Area Source	72	195	1	14	291		
b Distillate Oil-Pt. Source	3	7	0	0	13	449	MYG
4.a Residual Oil-Area Source	8	52	0	1	20		
b Residual Oil-Pt. Source	5	45	0	1	27	890	MGY
5.a Natural Gas-Area Source	130	5	51	205	993		
b Natural Gas-Pt. Source	53	1	1	118	513	5905	MCF
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	0	4	0	0	2		
8. TOTAL	10247	11759	8217	2329	3567		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	0	2584	21	6	377	41842	T/YR
3. Distillate Oil	3	31	0	1	13	424	GYM
4. Residual Oil							
5. Natural Gas							
6. Other	3322	0	0	0	0		
7. TOTAL	3325	2615	21	7	390		
D. TOTAL FUEL COMBUSTION	14267	15706	9992	2789	4625		
II. PROCESS LOSSES							
A. Point Sources	30297	1681	10496	10032	2335		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	0	0	0	0	0		
1.b On Site-Point Source	13	0	38	14	6	2724	T/YR
B. Open Burning							
1. On Site-Area Source	2379	149	12636	4460	892		
C. TOTAL SOLID WASTE DISPOSAL	2392	149	12674	4474	898		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	648	393	169963	29683	10988		
Motor Vehicles-Diesel	14	25	183	37	191		
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	0	2	12	0	0		
D. Railroad	6	19	19	14	20		
E. Vessels	11	91	6	2	20		
F. Gasoline Hndlg. Evap. Losses				2140			
G. Other							
H. TOTAL TRANSPORTATION	679	530	170183	31876	11219		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				2410			
C. TOTAL MISCELLANEOUS				2410			
VI. GRAND TOTAL							
A. AREA SOURCE	12998	9507	192697	41367	15186		
B. POINT SOURCE	34637	8559	10648	10214	3891		
C. TOTAL	47635	18066	203345	51581	19077		

Table 5.12 EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Steubenville-Weirton-Wheeling Interstate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	1891	4490	5908	1418	591	236324	TONS
2. Distillate Oil	38	55	19	11	46	7661	Bbl
3. Natural Gas	101	3	107	43	400	10676	
4. Wood							
5. Other							
6. TOTAL	2030	4548	6034	1472	1037		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	8157	6751	7785	1876	1000	340235	
b Bituminous Coal-Pt. Source	14641	13148	214	105	1713	2241561	T/YR
2. Coke							
3.a Distillate Oil-Area Source	68	183	1	14	272	9064	
b Distillate Oil-Pt. Source	4	15	0	0	14	467	MGY
4.a Residual Oil-Area Source	6	40	0	1	15	502	
b Residual Oil-Pt. Source	41	281	0	5	106	3540	MGY
5.a Natural Gas-Area Source	120	4	35	209	861	13142	
b Natural Gas-Pt. Source	47	2	8	99	416	5199	MCF
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	5	3	4	2	25		
8. TOTAL	23089	20427	8047	2311	4422		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	99534	605656	4934	1481	90008	9868027	T/YR
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas							
6. Other							
7. TOTAL	99534	605656	4934	1481	90008		
D. TOTAL FUEL COMBUSTION	124653	630631	19015	5264	95467		
II. PROCESS LOSSES							
A. Point Sources	365015	6902	38739	1330	2258		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	66	14	94	28	28	18720	
1.b On Site-Point Source	145	9	541	343	35	17959	T/YR
B. Open Burning							
1. On Site-Area Source	1836	115	9753	3442	688	229479	
C. TOTAL SOLID WASTE DISPOSAL	2047	138	10388	3813	751		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	618	374	162196	28308	19979	1872980	
Motor Vehicles-Diesel	18	33	236	47	247	1453	
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	12	123	73	186	12		
D. Railroad	6	17	17	12	18	480	
E. Vessels	98	254	273	195	292		
F. Gasoline Hndlg. Evap. Losses				1270			
G. Other							
H. TOTAL TRANSPORTATION	752	801	162795	30018	20548		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				1811			
C. TOTAL MISCELLANEOUS							
VI. GRAND TOTAL							
A. AREA SOURCE	13035	12456	186497	38871	24449		
B. POINT SOURCE	479432	626016	44440	3365	94575		
C. TOTAL	492467	638472	230937	42236	119024		

Table 5.13 EMISSIONS INVENTORY SUMMARY

For the State of Ohio

Wilmington-Chillicothe-Logan Intrastate Air Quality Control Region

Data Representative of Calendar Year 1970

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source							
1. Coal	1033	2454	3229	775	323	129166	
2. Distillate Oil	67	97	34	20	80	13406	
3. Natural Gas	53	2	56	22	210	5596	
4. Wood							
5. Other							
6. TOTAL	1153	2553	3319	817	613		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	6296	3255	6115	1473	773	265598	
b Bituminous Coal-Pt. Source	9362	33707	282	104	3870	45019	T/YR
2. Coke							
3.a Distillate Oil-Area Source	53	143	1	10	212	7063	
b Distillate Oil-Pt. Source	1	5	0	0	4	979	MGY
4.a Residual Oil-Area Source	5	29	0	0	12	369	
b Residual Oil-Pt. Source	9	54	0	1	22	752	MGY
5.a Natural Gas-Area Source	37	2	21	46	244	3966	
b Natural Gas-Pt. Source	14	0	4	21	101		
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source							
8. TOTAL	15777	37195	6423	1655	5238		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal							
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas							
6. Other							
7. TOTAL							
D. TOTAL FUEL COMBUSTION	16930	39748	9742	2472	5851		
II. PROCESS LOSSES							
A. Point Sources	1770	465	7045	432	52		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	0	0	0	0	0		
1.b On Site-Point Source	169	7	416	109	19	437	
B. Open Burning							
1. On Site-Area Source	1311	82	6964	2458	492	163849	
C. TOTAL SOLID WASTE DISPOSAL	1480	89	7380	2567	511		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	484	293	117943	21125	16017	1465490	
Motor Vehicles-Diesel	14	26	186	37	194	1144	
B. Off Highway Fuel Usage							

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	1	12	71	23	1		
D. Railroad	4	11	11	7	12	315	
E. Vessels							
F. Gasoline Hndlg. Evap. Losses				1660			
G. Other							
H. TOTAL TRANSPORTATION	503	342	118211	22852	16224		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				923			
C. TOTAL MISCELLANEOUS							
VI. GRAND TOTAL							
A. AREA SOURCE	9358	6406	134631	28579	18570		
B. POINT SOURCE	11325	34238	7747	690	4068		
C. TOTAL	20683	40644	142378	29246	22638		

Table 5.14 EMISSIONS INVENTORY SUMMARY
For the State of Ohio
Zanesville-Cambridge Intrastate Air Quality Control Region
Data Representative of Calendar Year 1970

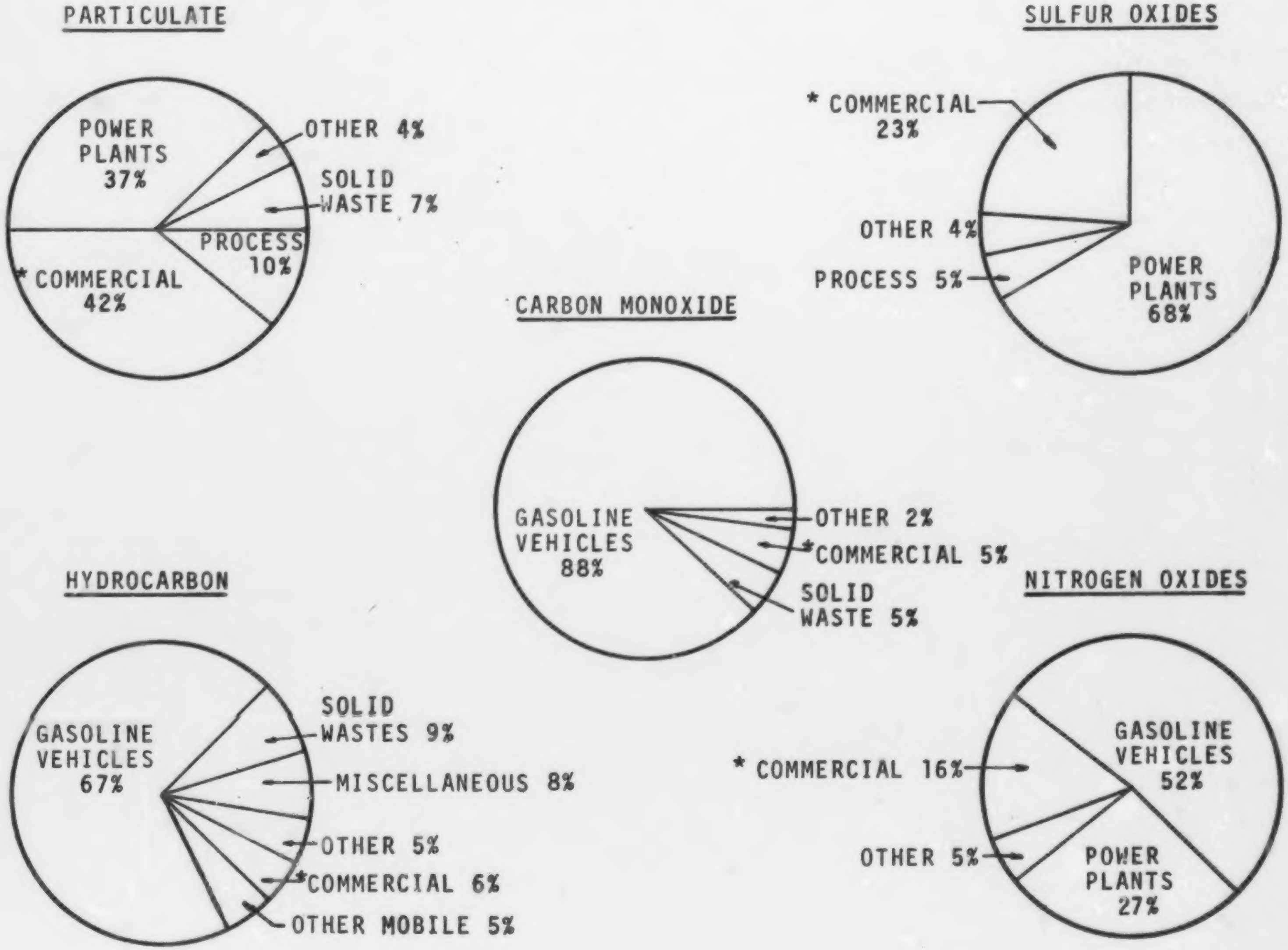
SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
I. FUEL COMBUSTION							
A. Residential Fuel-Area Source	1675	3977	5233	1256	523		
1. Coal	38	55	19	11	45		
2. Distillate Oil	139	4	146	58	547		
3. Natural Gas							
4. Wood							
5. Other							
6. TOTAL	1852	4036	5398	1325	1115		
B. Comm.-Instl. & Industrial							
1.a Bituminous Coal-Area Source	8290	6809	7787	1877	1016		
b Bituminous Coal-Pt. Source	1977	10250	345	141	1582	390259	T/YR
2. Coke							
3.a Distillate Oil-Area Source	68	185	1	14	274		
b Distillate Oil-Pt. Source							
4.a Residual Oil-Area Source	6	42	0	2	16		
b Residual Oil-Pt. Source							
5.a Natural Gas-Area Source	238	8	61	431	2000		
b Natural Gas-Pt. Source	71	8	2	154	667	8493	MCF
6. Process Gas-Pt. Source							
7.a Other-Area Source							
b Other-Pt. Source	54	78	163	35	10		
8. TOTAL	10704	7380	8359	2654	5565		

EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Steam-Electric Power Plant							
1. Anthracite Coal							
2. Bituminous Coal	61580	183694	1174	1713	46004	23101683	T/YR
3. Distillate Oil							
4. Residual Oil							
5. Natural Gas							
6. Other							
7. TOTAL	61580	183694	1174	1713	46004		
D. TOTAL FUEL COMBUSTION	74136	205110	14931	5692	52684		
II. PROCESS LOSSES							
A. Point Sources	133905	3619	17742	7120	4410		
III. SOLID WASTE DISPOSAL							
A. Incineration							
1.a On Site-Area Source	0	0	0	0	0		
1.b On Site-Point Source	68	3	86	73	14	868	T/YR
B. Open Burning							
1. On Site-Area Source	2203	138	11703	4130	826		
C. TOTAL SOLID WASTE DISPOSAL	2271	141	11789	4203	840		
IV. TRANSPORTATION-AREA SOURCE							
A. Motor Vehicles-Gasoline	617	373	152463	27171	20328		
Motor Vehicles-Diesel	18	32	237	46	243		
B. Off Highway Fuel Usage							

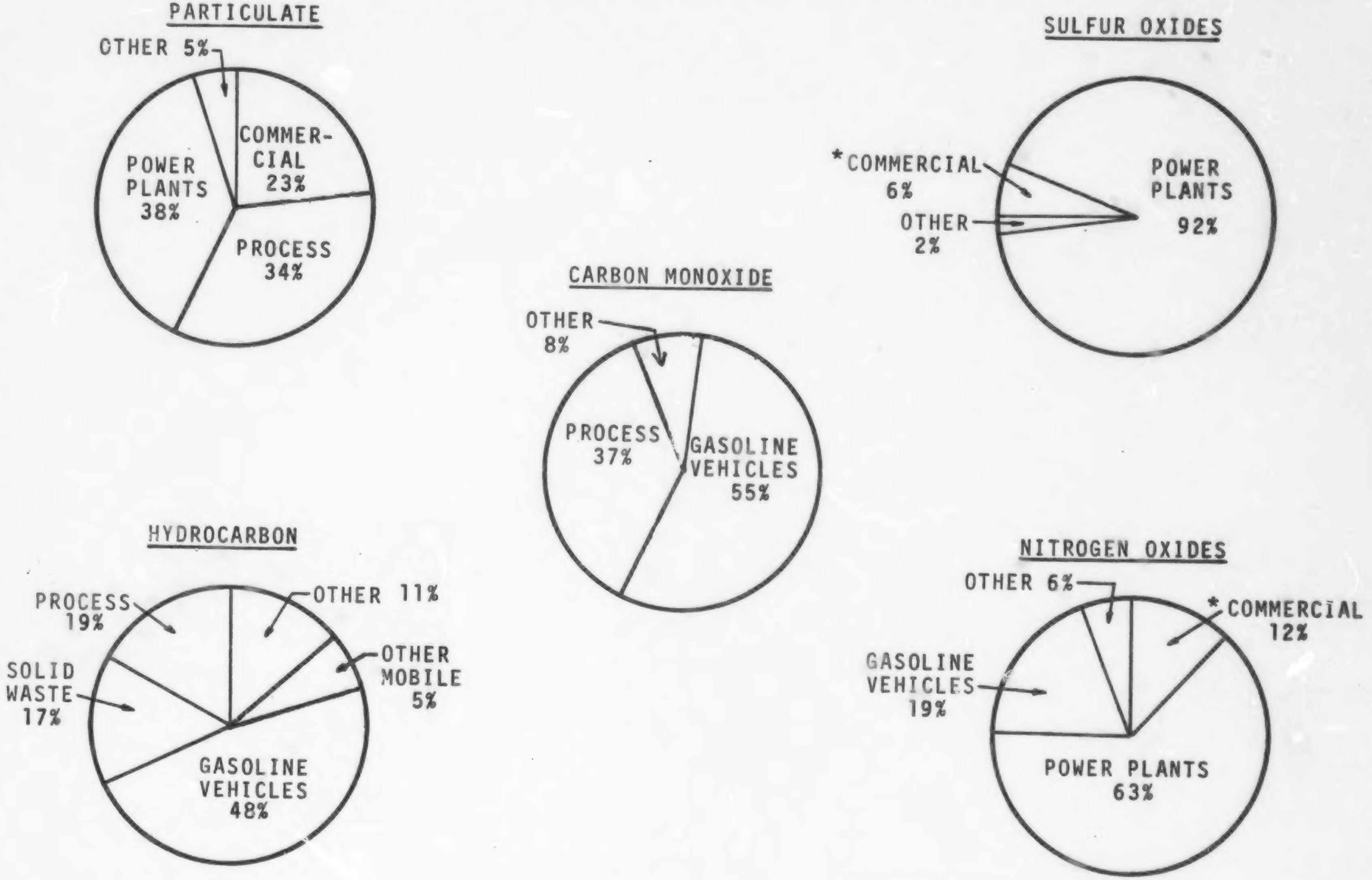
EMISSIONS INVENTORY SUMMARY

SOURCE CATEGORY	Tons of Pollutant/Year					Fuel, etc.	
	Part.	SO_2	CO	HC	NO_x	Quantity	Units
C. Aircraft	7	19	116	11	5		
D. Railroad	5	16	16	12	17		
E. Vessels							
F. Gasoline Hndlg. Evap. Losses				2058			
G. Other							
H. TOTAL TRANSPORTATION	647	440	152832	29298	20593		
V. MISCELLANEOUS-AREA SOURCES							
A. Agricultural Burning							
B. Solvent				1396			
C. TOTAL MISCELLANEOUS				1396			
VI. GRAND TOTAL							
A. AREA SOURCE	13304	11658	177782	38473	25840		
B. POINT SOURCE	197655	197652	19512	9236	52687		
C. TOTAL	210959	209310	197294	47709	78527		



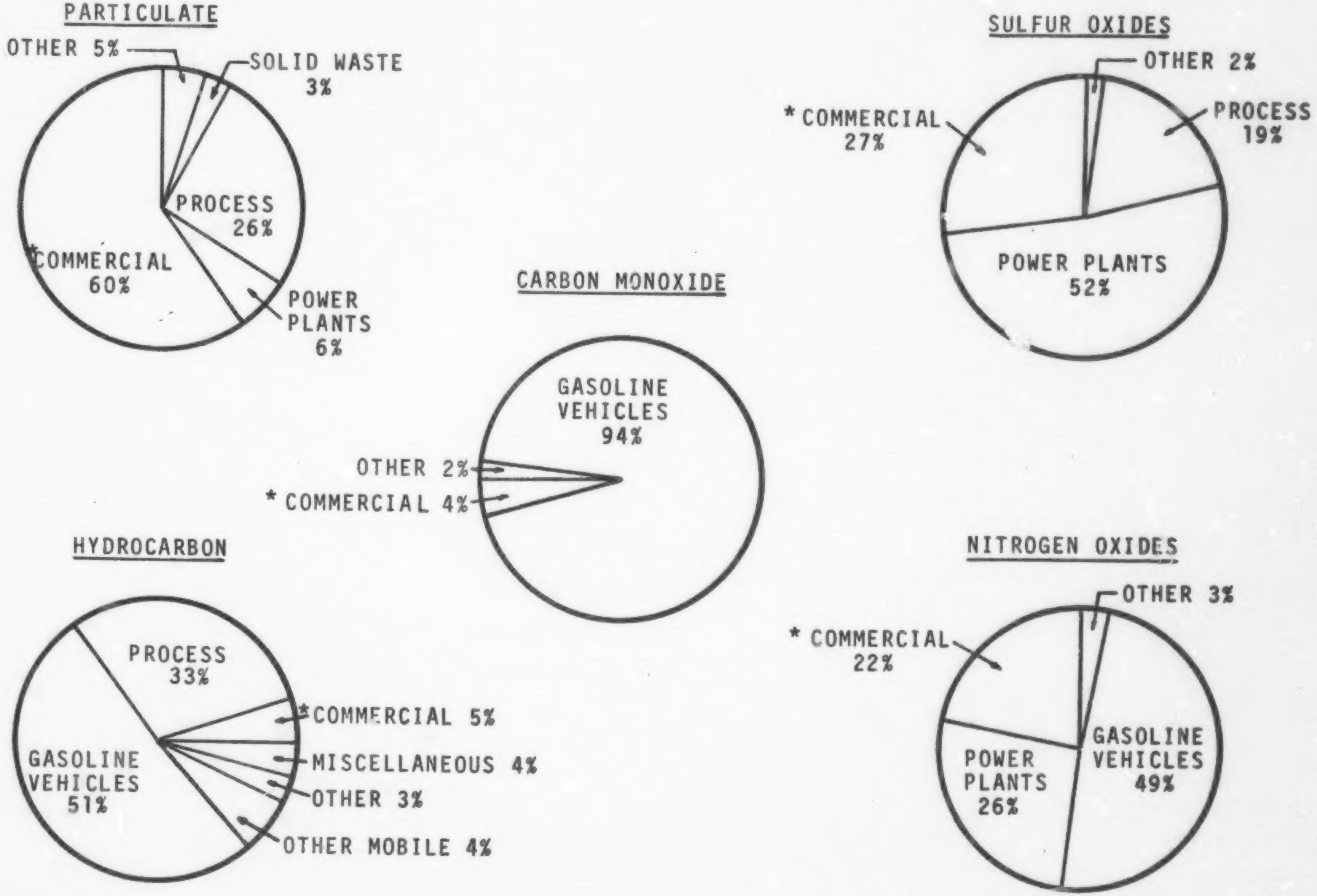
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.1 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - OHIO PORTION OF THE METROPOLITAN CINCINNATI INTERSTATE AIR QUALITY CONTROL REGION



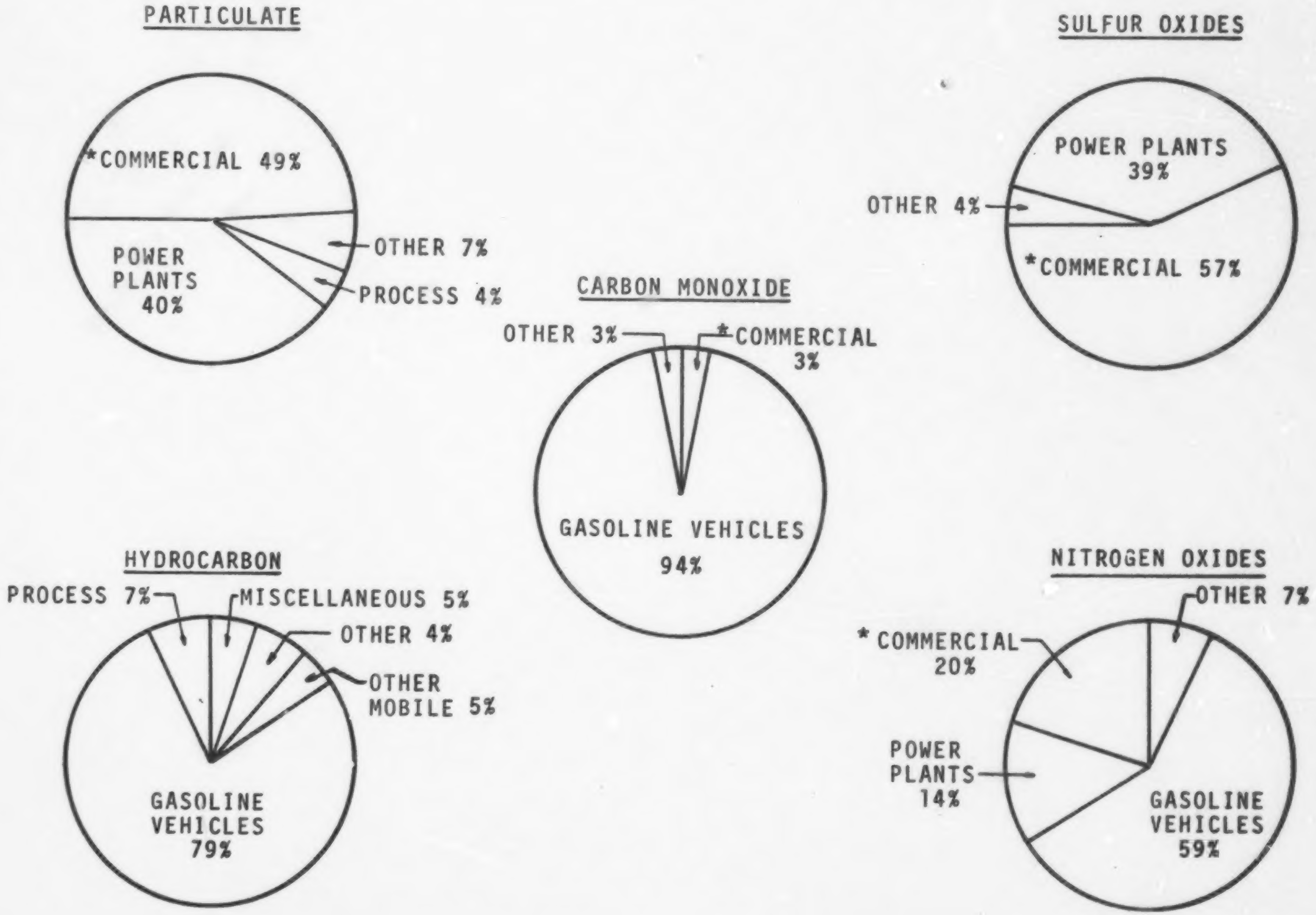
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.2 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - OHIO PORTION OF THE HUNTINGTON-ASHLAND-PORTSMOUTH-IRONTON INTERSTATE AIR QUALITY CONTROL REGION



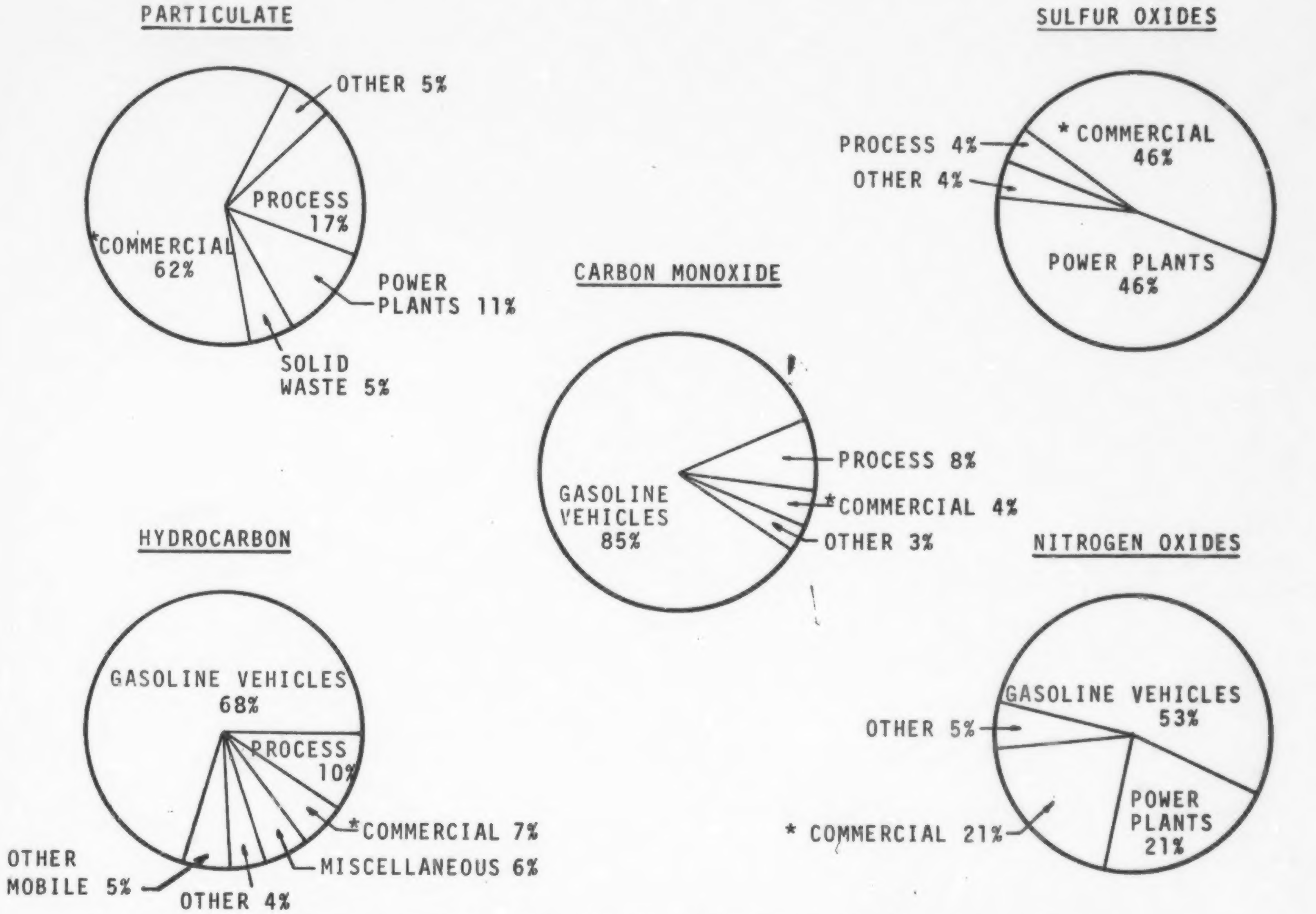
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.3 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - OHIO PORTION OF THE METROPOLITAN TOLEDO INTERSTATE AIR QUALITY CONTROL REGION



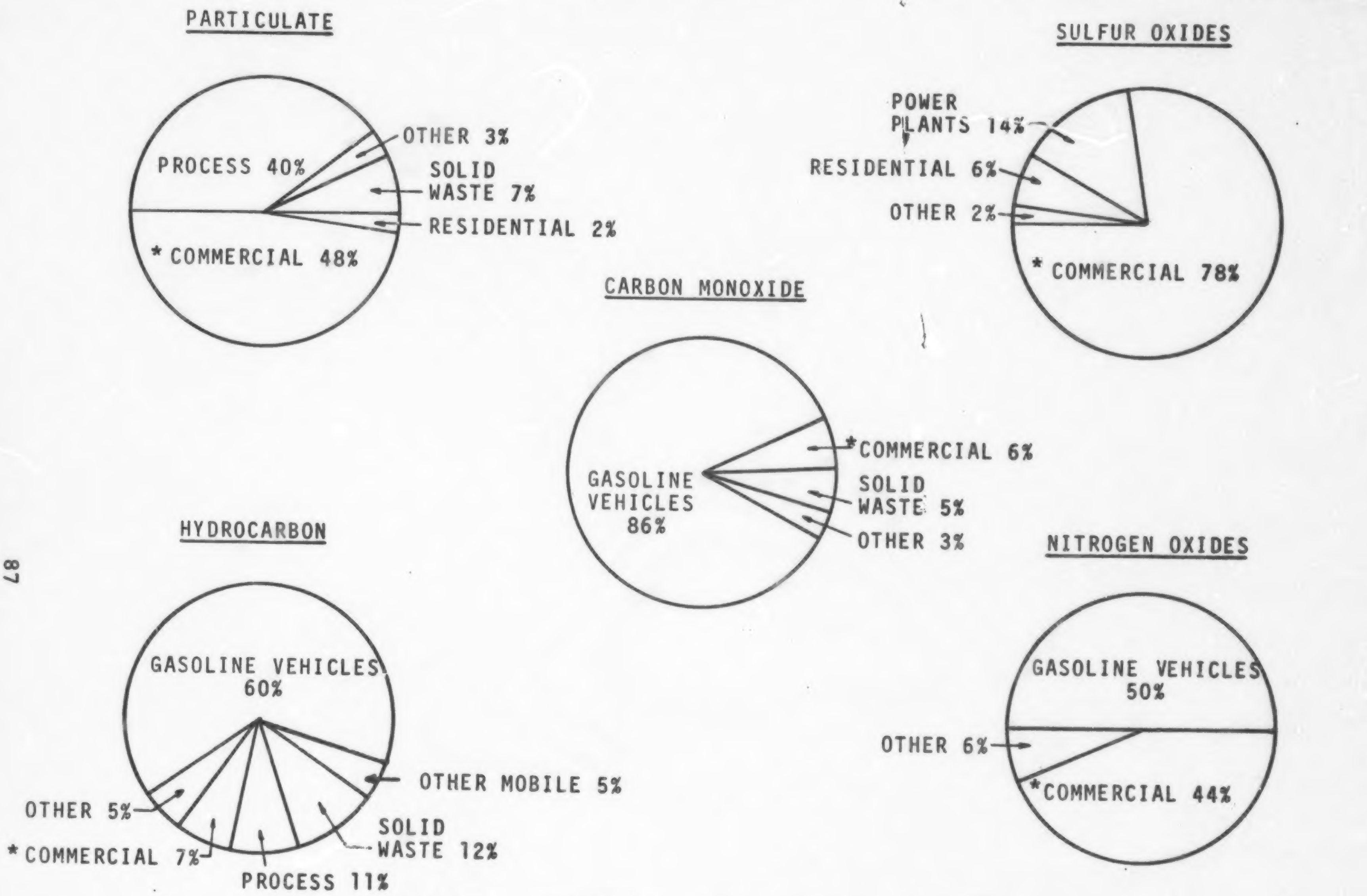
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.4 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - DAYTON INTRASTATE AIR QUALITY CONTROL REGION



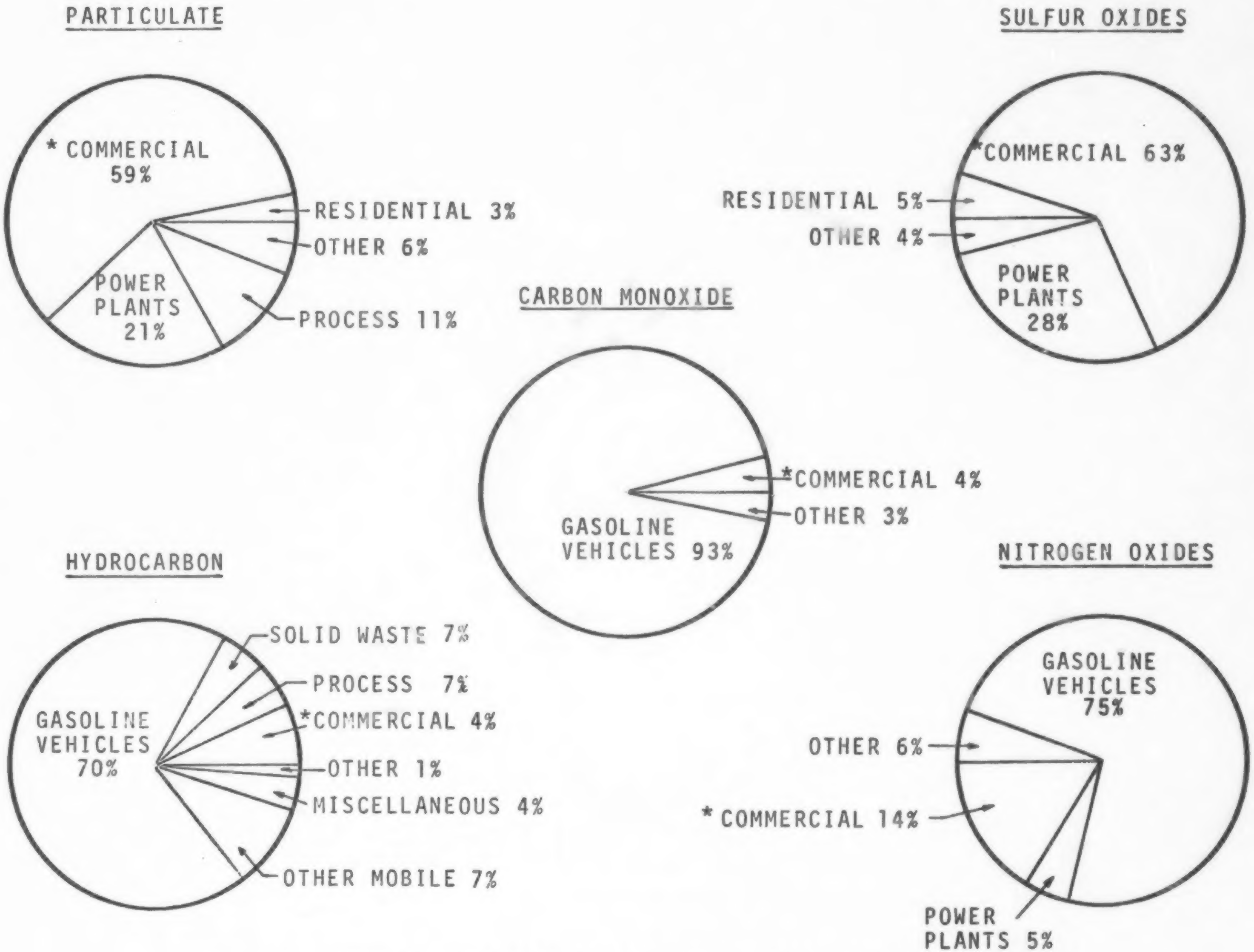
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.5 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - GREATER METROPOLITAN CLEVELAND INTRASTATE AIR QUALITY CONTROL REGION



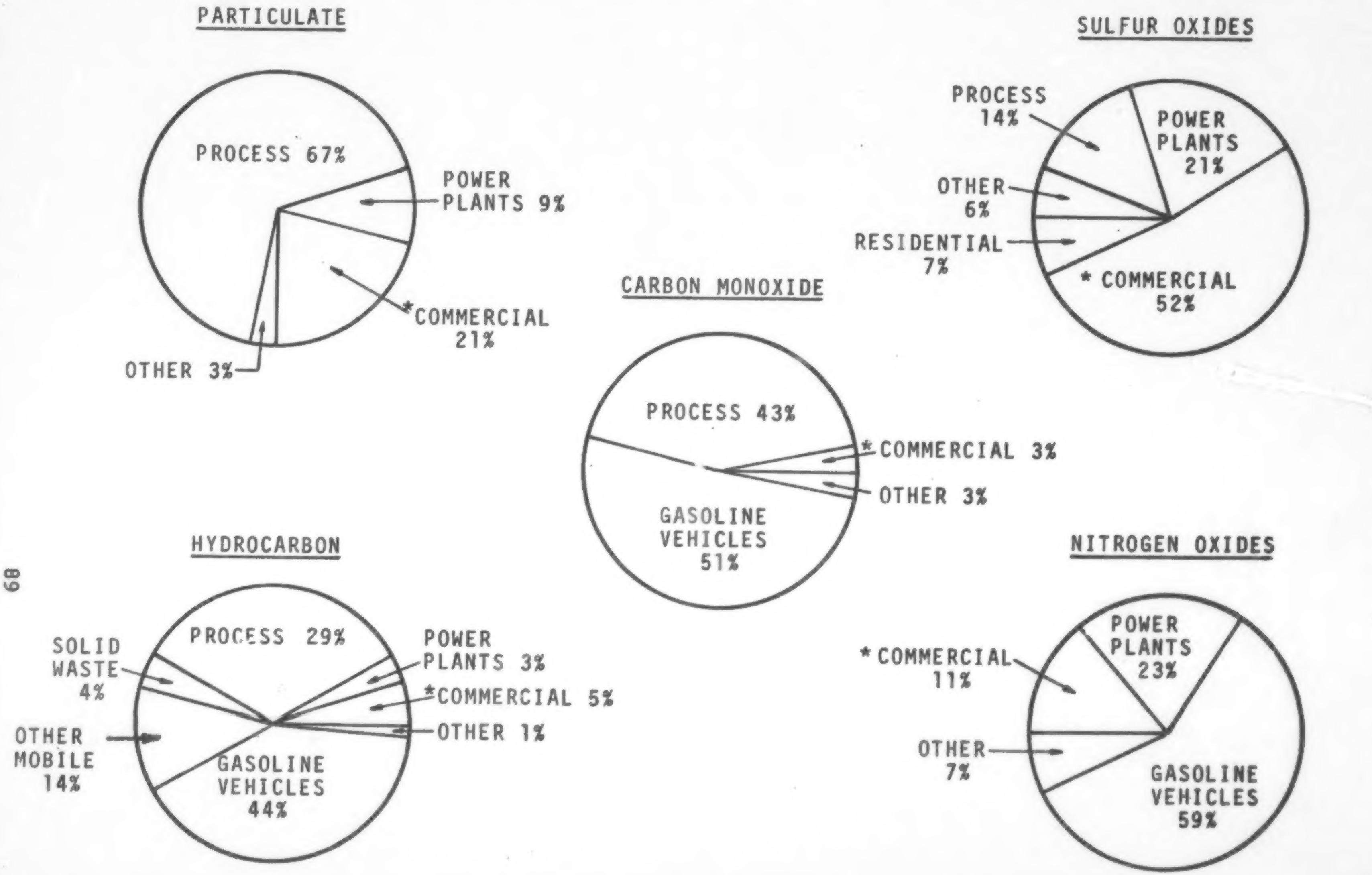
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.6 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - MANSFIELD-MARION INTRASTATE AIR QUALITY CONTROL REGION



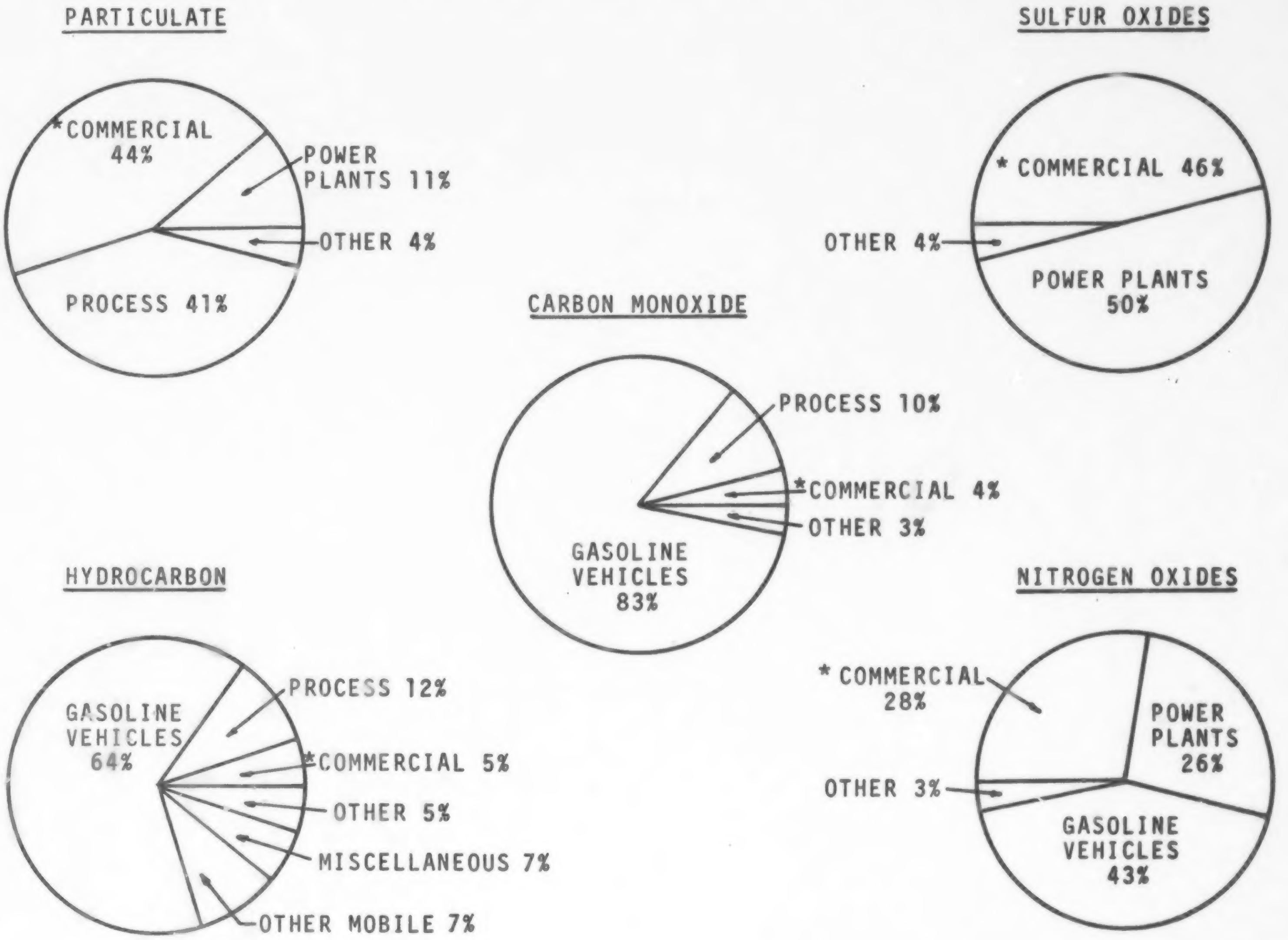
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.7 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - METROPOLITAN COLUMBUS INTRASTATE AIR QUALITY CONTROL REGION



* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.8 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - NORTHWEST OHIO INTRASTATE AIR QUALITY CONTROL REGION



* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.9 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - OHIO PORTION OF THE NORTHWEST PENNSYLVANIA-YOUNGSTOWN INTERSTATE AIR QUALITY CONTROL REGION

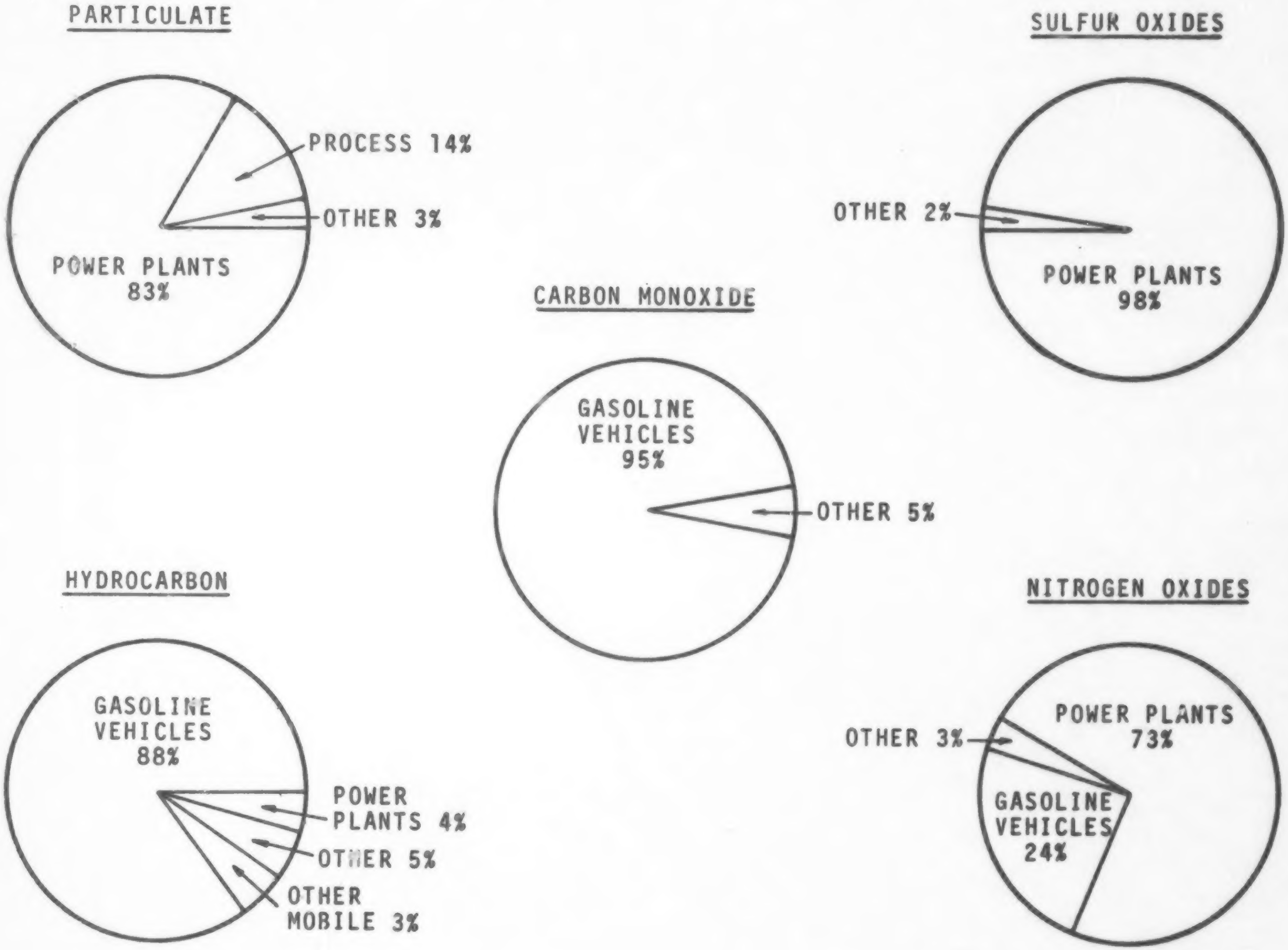
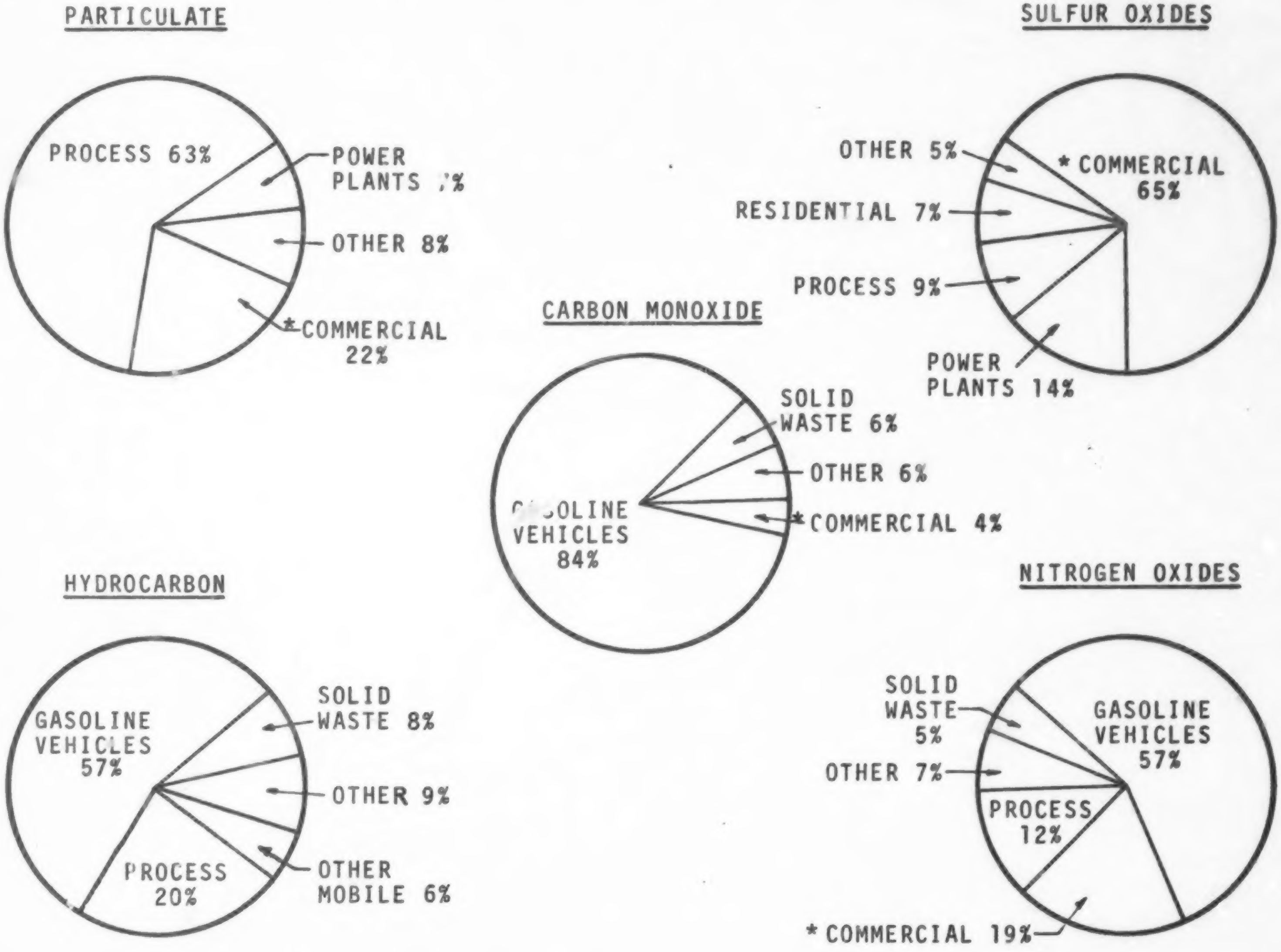
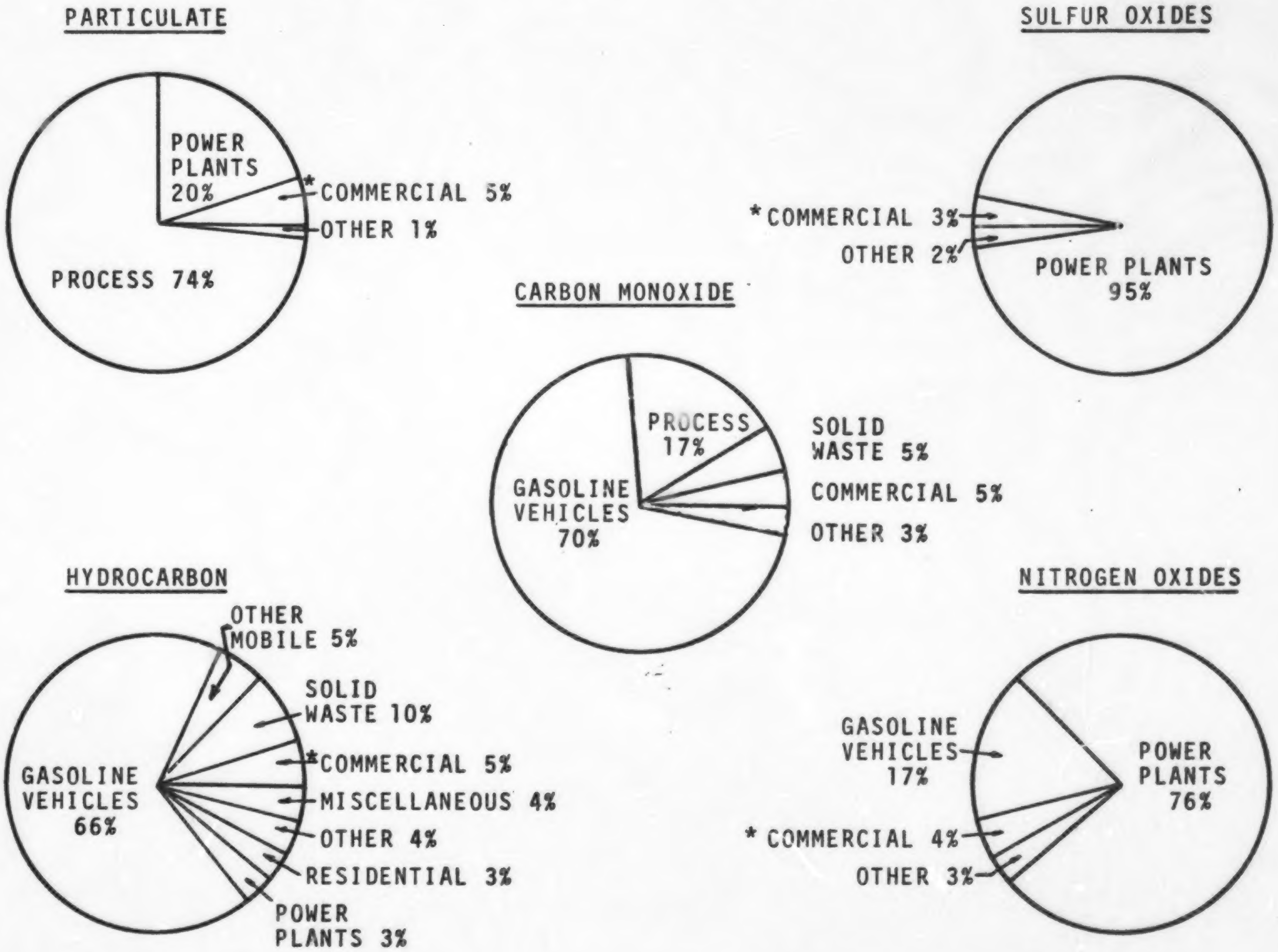


FIGURE 5.10 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - OHIO PORTION OF THE PARKERSBURG-MARIETTA INTERSTATE AIR QUALITY CONTROL REGION



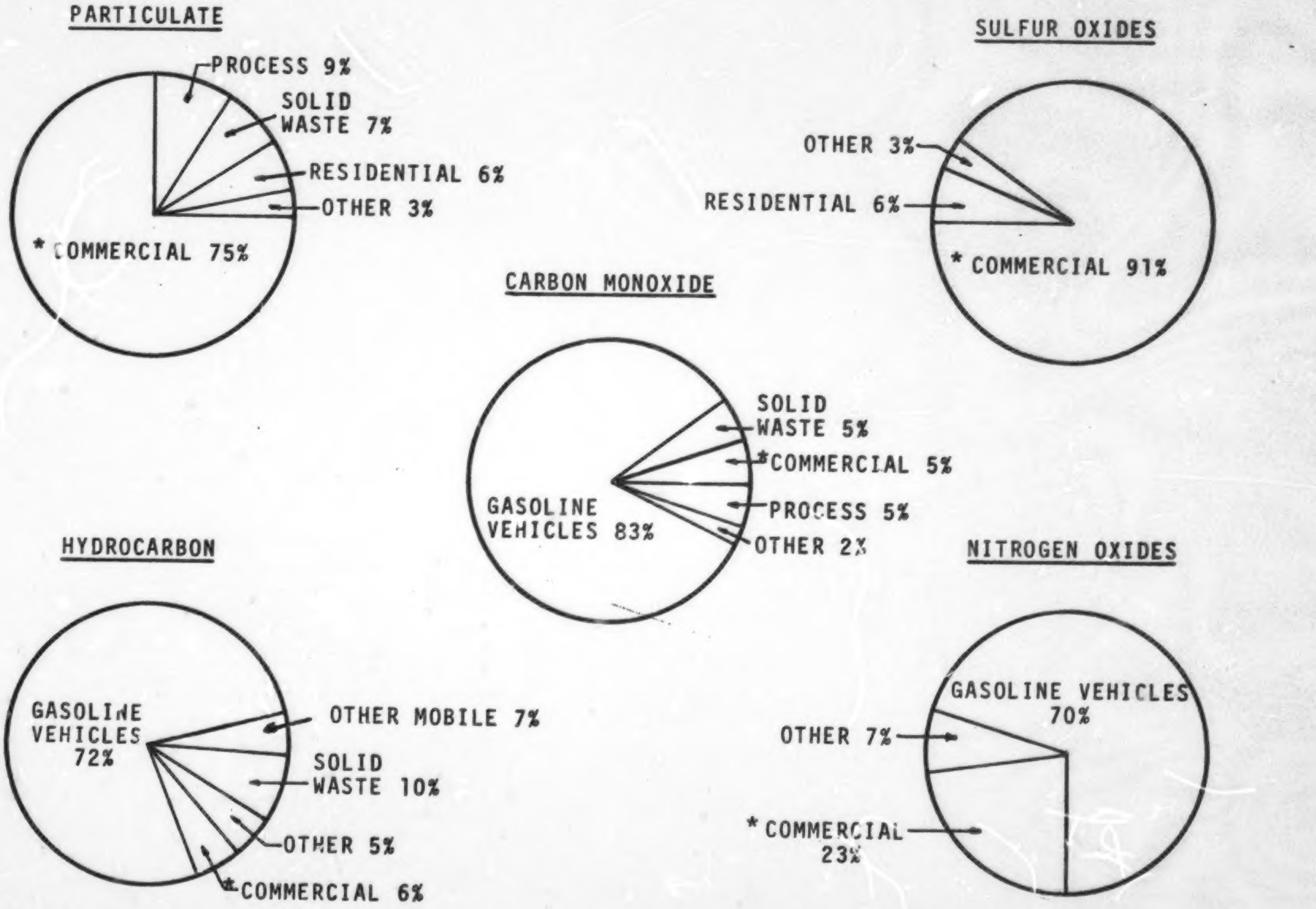
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.11 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - SANDUSKY INTRASTATE AIR QUALITY CONTROL REGION



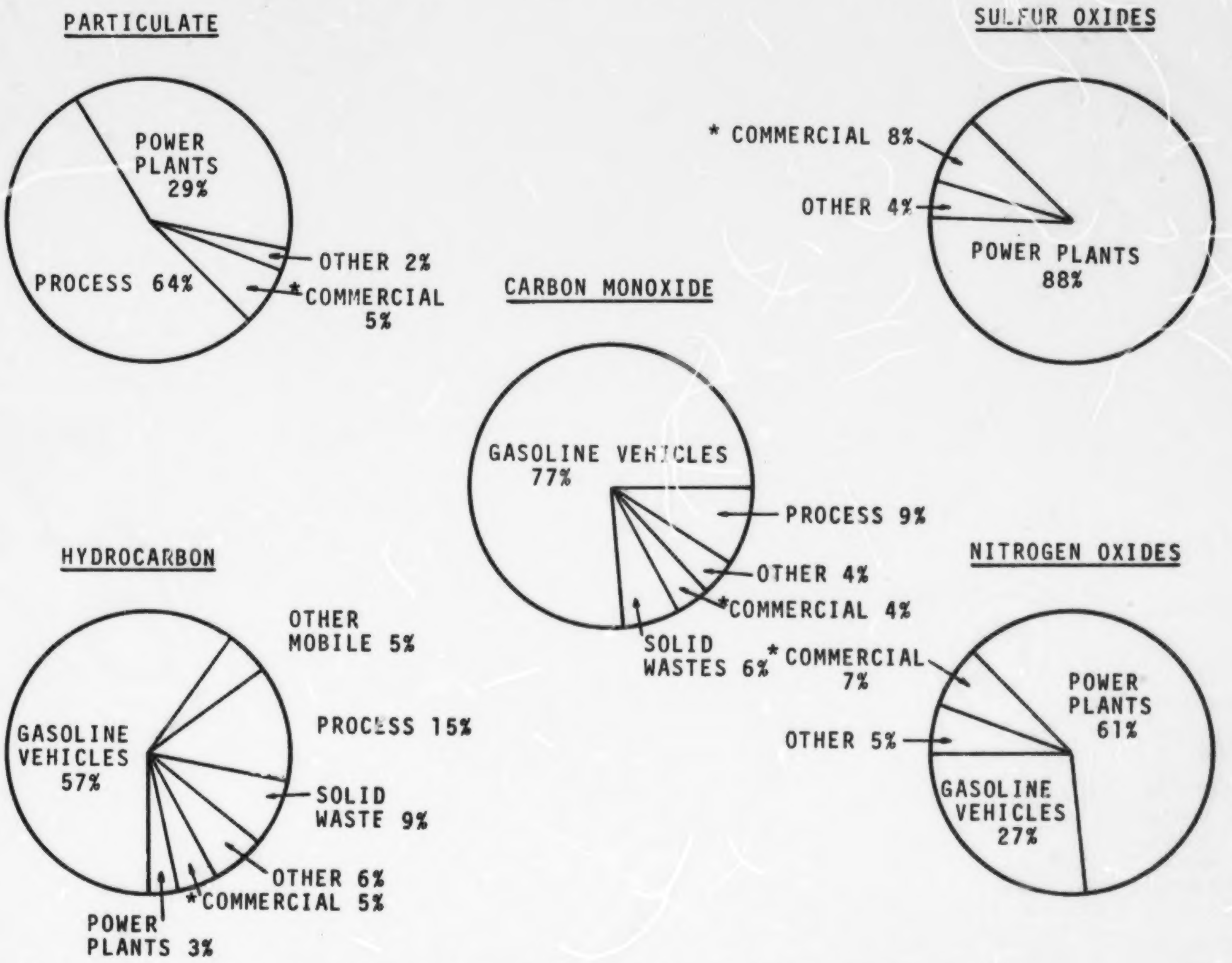
* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.12 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - OHIO PORTION OF THE STEUBENVILLE-WEIRTON-WHEELING INTERSTATE AIR QUALITY CONTROL REGION



* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.13 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - WILMINGTON-CHILLICOTHE-LOGAN INTRASTATE AIR QUALITY CONTROL REGION



* FUEL COMBUSTION - COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL

FIGURE 5.14 POLLUTANTS EMITTED BY PRINCIPAL SOURCES - ZANESVILLE-CAMBRIDGE INTRASTATE AIR QUALITY CONTROL REGION

REFERENCES

1. U.S. Census of Population and Housing, PHC Series, U.S. Department of Commerce, Washington, D.C., 1960, HC(1)-37.

2. Steam-Electric Plant Factors, National Coal Association (1970), Washington, D.C.

3. Directory of Iron and Steel Works of the United States and Canada, American Iron & Steel Institute, New York, N.Y.

4. Atmospheric Emissions from the Manufacture of Portland Cement, USDHEW, PHS, NAPCA, Public Health Service Publication Number 999-AP-17, Cincinnati, Ohio, 1967.

5. Atmospheric Emissions from Sulfuric Acid Manufacturing Processes, USDHEW, PHS, DAP, PHS Publication Number 999-AP-13, Cincinnati, Ohio, 1965.

6. Atmospheric Emissions from Nitric Acid Manufacturing Processes, USDHEW, PHS, DAP, PHS Publication Number 999-AP-27, Cincinnati, Ohio, 1966.

7. U.S. Refineries, Where, Capacities, Types of Processing, Oil and Gas Journal (Annual Report).

8. Distribution of Pennsylvania Anthracite (1970), U.S. Department of Interior, Bureau of Mines, Division of Anthracite Coal - Mineral Resource Development.

9. Fuels and Electric Energy Consumed in Manufacturing Industries (1962 or any year available), U.S. Department of Commerce, Bureau of Census, Census of Manufactures.

10. Minerals Yearbook, Volume II, Mineral Fuels (1969), U.S. Department of Interior, Bureau of Mines, U.S. Government Printing Office, Washington, D.C.

11. Bituminous Coal and Lignite Distribution (1970), U.S. Department of Interior, Bureau of Mines, Division of Bituminous Coal - Mineral Resource Development.

12. Census of Manufacture (1967), U.S. Department of Commerce, Bureau of the Census, MC 67(3)36.

13. Census of Business (1967), Retail Trade, U.S. Department of Commerce, Bureau of the Census, BC 67-RA 37.

14. Census of Business (1967), Wholesale Trade, U.S. Department of Commerce, Bureau of the Census, BC 67-WA 37.

15. Shipments of Fuel Oil and Kerosene (1970), U.S. Department of Interior, Bureau of Mines, Section of Fuels, Division of Statistics.

16. Petroleum Facts and Figures (1967), American Petroleum Institute, New York, New York.

17. United States Census of Housing, 1960, Final Report, Number 15, State and Small Areas, U.S. Department of Commerce. Similar reports are available for each state, HC series, Washington, D.C., 1960.

18. Rapid survey technique for estimating community air pollution emissions, PHS Publication Number 999-AP-29, USDHEW, NAPCA, Cincinnati, Ohio, October, 1966 (Appendix C, pp. 43-45).

19. U.S. Census of Population and Housing, PHC Series, U.S. Department of Commerce, Washington, D.C., 1970, HC(1)-37.

20. Local Climatological Data (Monthly and Annual), Superintendent of Documents, Government Printing Office, Washington, D.C. 20025.

21. Climatography of the United States, Number 84, Decennial Census of United States Climate, Daily Normals of Temperature and Heating Degree-Days, U.S. Department of Commerce, Weather Bureau, 1963, Superintendent of Documents, Government Printing Office, Washington, D.C. 20025.

22. Analysis of motor fuel usage (1970), U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads, Washington, D.C.

23. Automobile facts and figures (1970), Automobile Manufacturers Association, Inc., Detroit, Michigan.

24. C.R. Rehmann, Motor vehicle exhaust emissions - Gary, Indiana, USDHEW, PHS, NAPCA, Durham, North Carolina, 1968.

25. A rapid survey technique for estimating community air pollution emissions, PHS Publication Number 999-AP-29, USDHEW, PHS, DAP, Cincinnati, Ohio, October, 1966.

26. Duprey, R.L., Compilation of air pollution emission factors, PHS Publication Number 999-AP-42, USDHEW, PHS, NAPCA, Durham, North Carolina, 1968.

27. Rose, A.H., et al., "Comparison of auto exhaust emissions from two major cities," USDHEW, PHS, DAP, presented at the APCA annual meeting, Toronto, Canada, June, 1965.

28. "Waterborne Commerce of the United States," Department of the Army Corps of Engineers, New Orleans, Louisiana, 1969.

29. City and County Data Book, 1967, U.S. Department of Commerce, Bureau of the Census, Washington, D.C.

30. Air Pollution Engineering Manual, USDHEW, PHS, NAPCA, Cincinnati, Ohio, 1967.

31. Steigerwald, B.J., et al., Atmospheric emissions from petroleum refineries, PHS Publication Number 763, U.S. Government Printing Office, Washington, D.C.

32. Schueneman, J.J., et al., Air Pollution aspects of the iron and steel industry, PHS Publication Number 999-AP-1, Division of Air Pollution, Washington, D.C., June, 1963.

33. Control Technology for Sulfur Oxides Air Pollutants, DHEW, Public Health Service (published).

34. Lozano, et al., Air pollution emissions from jet engines, presented at the APCA meeting, Cleveland, Ohio, June, 1967.

35. Gerstle, R.W., et al., Atmospheric emissions from open burning, presented at the APCA meeting, Cleveland, Ohio, June, 1967.

36. Von Lehmden, D.J., et al., Polynuclear hydrocarbon emissions from selected industrial processes, JAPCA, July, 1965.

37. Census of Business - Selected Services, 1967. U.S. Department of Commerce, BC 67-SA 37.

38. Greenwood's Guide to Great Lakes Shipping - 1971. Freshwater Press Inc., Cleveland, Ohio.

39. Airport Activity Statistics of Certified Route Air Carriers, Dept. of Transportation, F.A.A.,1969.

40. Brown's Directory of North American Gas Companies.

41. National Solid Wastes Survey, (An Interim Report), U.S.D.H. Presented at 1968 Annual Meeting of Institute for Solid Wastes of the American Public Works Assoc., October 24, 1968.

42. Estimated Motor Fuel Consumption by County Based on Motor Vehicle Registration - 1969, Ohio Department of Taxation.

43. Paper Manufacturing and Printing - Industry Trend Series 4, U.S. Department of Commerce, B & DSA, 1969.

44. Chemicals, Petroleum, Rubber, and Plastic Products Manufacture Trend Series, U.S. Department of Commerce, B & DSA, 1969.

45. Air Pollution Emission Factors, Preliminary Document, Environmental Protection Agency, Research Triangle Park, North Carolina, April 1971.

46. Bierbaum, P.J. and M.J. Gedgaudas, Air Pollutant Emission Inventory Techniques, Unpublished report, Environmental Protection Agency, Research Triangle Park, North Carolina.